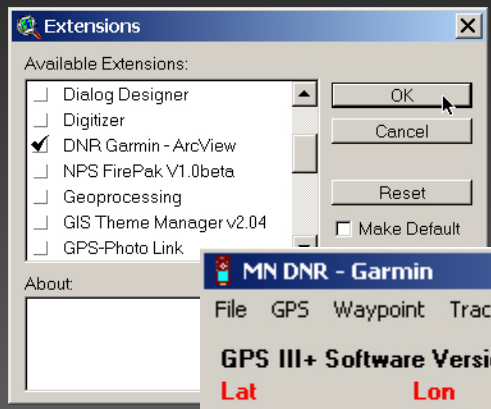
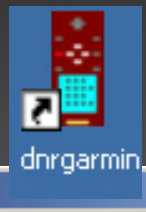
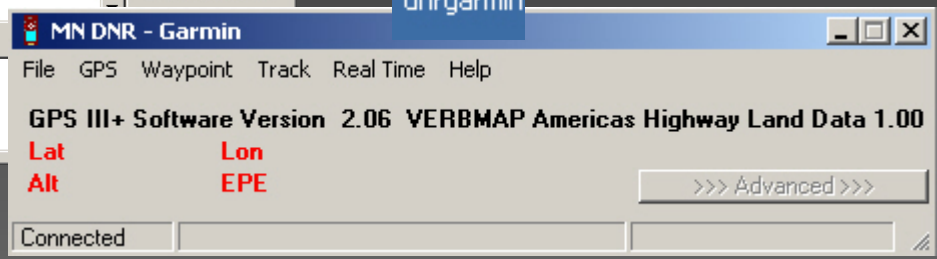
Post-Field

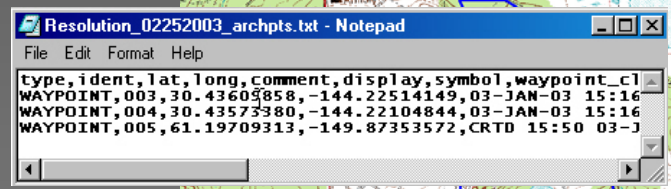
Collect Data



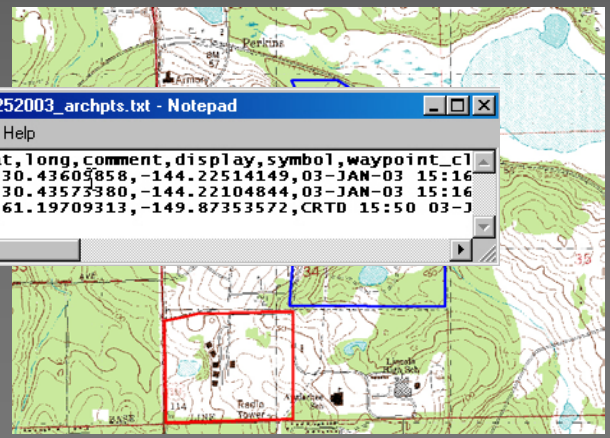




DNR Garmin



.txt



ArcView

Post-Field Overview

- DNR Garmin Program
- DNR Garmin Extension in ArcView

Managing GPS Data

Editing GPS & GIS Data

Attributing Data

Map Making

Review of ArcView Terminology

View =

Window to display (and sometimes edit) geographic features (as themes)

Shapefile =

ArcView data layer

Theme =

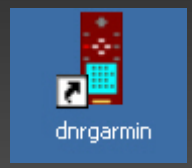
Single data layer (e.g., Shapefile) added to View

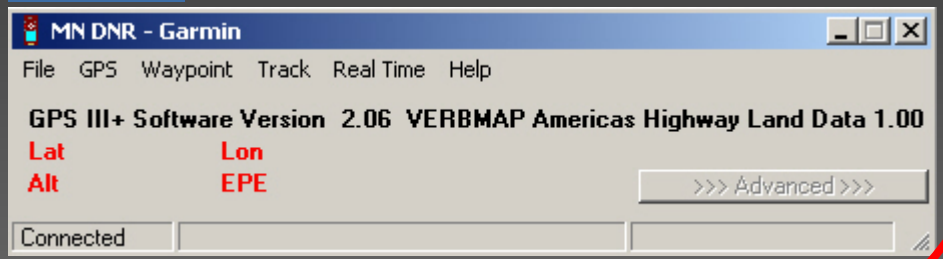
Layout =

Window to display View and graphics for map creation

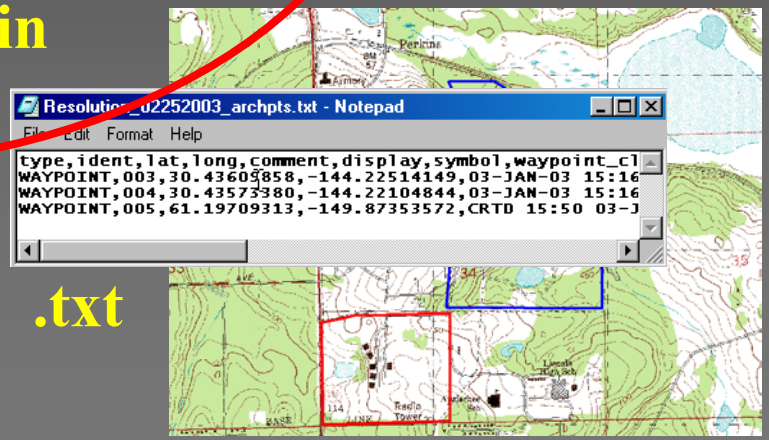
DNR Garmin: Installation and Setup

Collect Data





DNR Garmin



.txt

ArcView

Objectives

- Overview of DNR Garmin
- Install DNR Garmin
  - Requirements
  - Installation Steps

DNR Garmin

- Overview
  - Developed by Minnesota Dept. of Natural Resources
  - Integrates ESRI's ArcView 3.x software with all types of Garmin brand GPS receivers.
  - Comprised of a Visual Basic (VB) program and an ArcView extension
    - VB: DNRGarmin program (*.exe) communicates with GPS via a serial port allowing for transfer of waypoints and tracks
    - ArcView Extension: Allows for working in ArcView for shapefile / graphic creation (shapefiles in projection and datum of choice)

DNR Garmin

- Overview cont.
  - Can work independently of ArcView, data saved as text files (*.txt) or shapefiles in Lat/Long Decimal Degrees, WGS84 datum
  - Available from Internet or your Training CD
    - Training CD: /Software/DNRGarmin
    - Internet*

TIP http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html

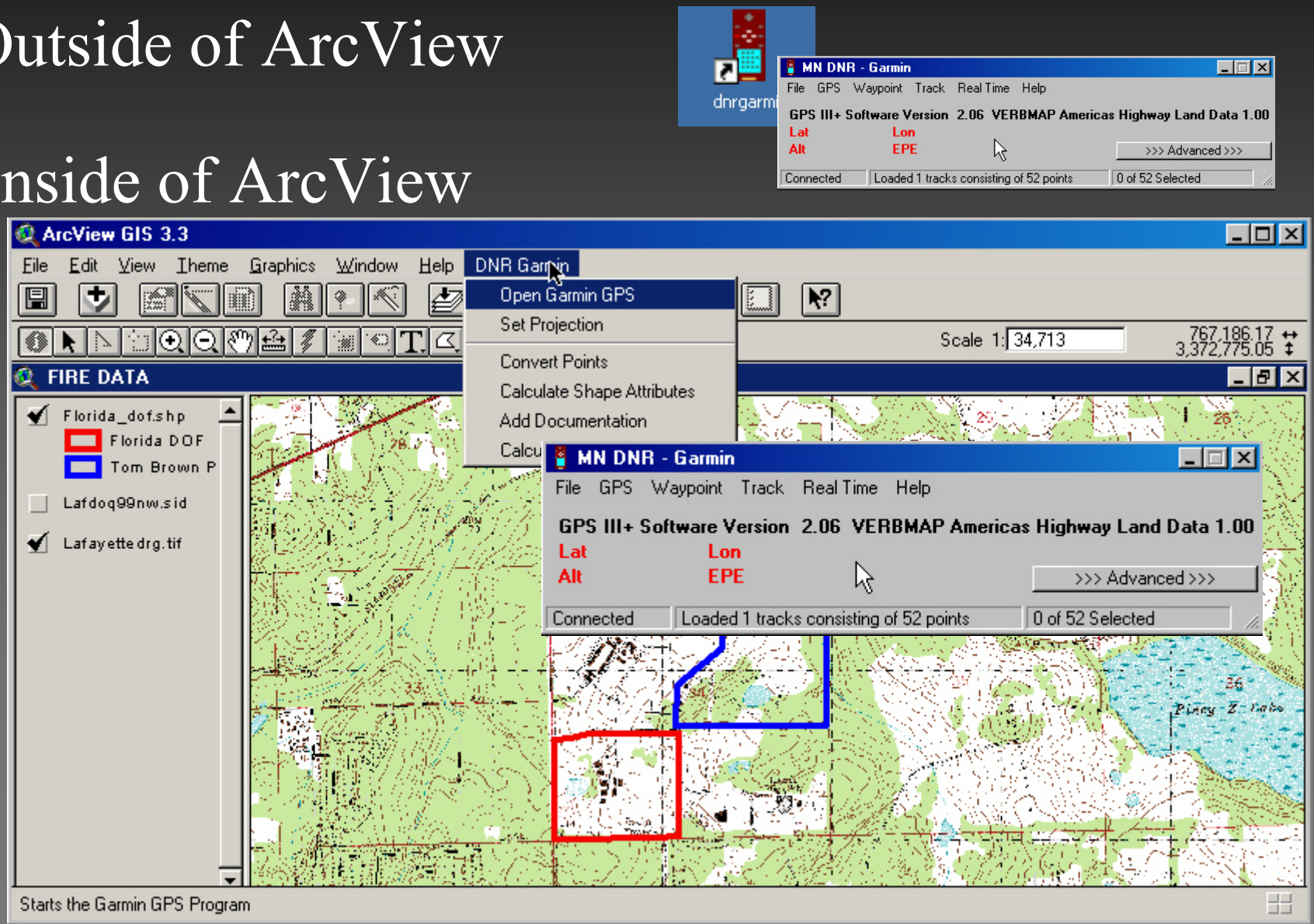
DNR Garmin Functionality Highlights

- Download / Upload Waypoints & Tracks
- Convert Waypoints to Points, Lines and Polygons
- Convert Tracks to Points, Lines or Polygons
- Calculates Area, Perimeter, Length
- Allows for Attribute documentation
- Real-Time Tracking*
- Convert Line/Polygon Shapefiles back to Tracks*
- Calculates Circular Error Probable (CEP)*

* Advanced techniques taught later in class!

How it Works

- Outside of ArcView
- Inside of ArcView

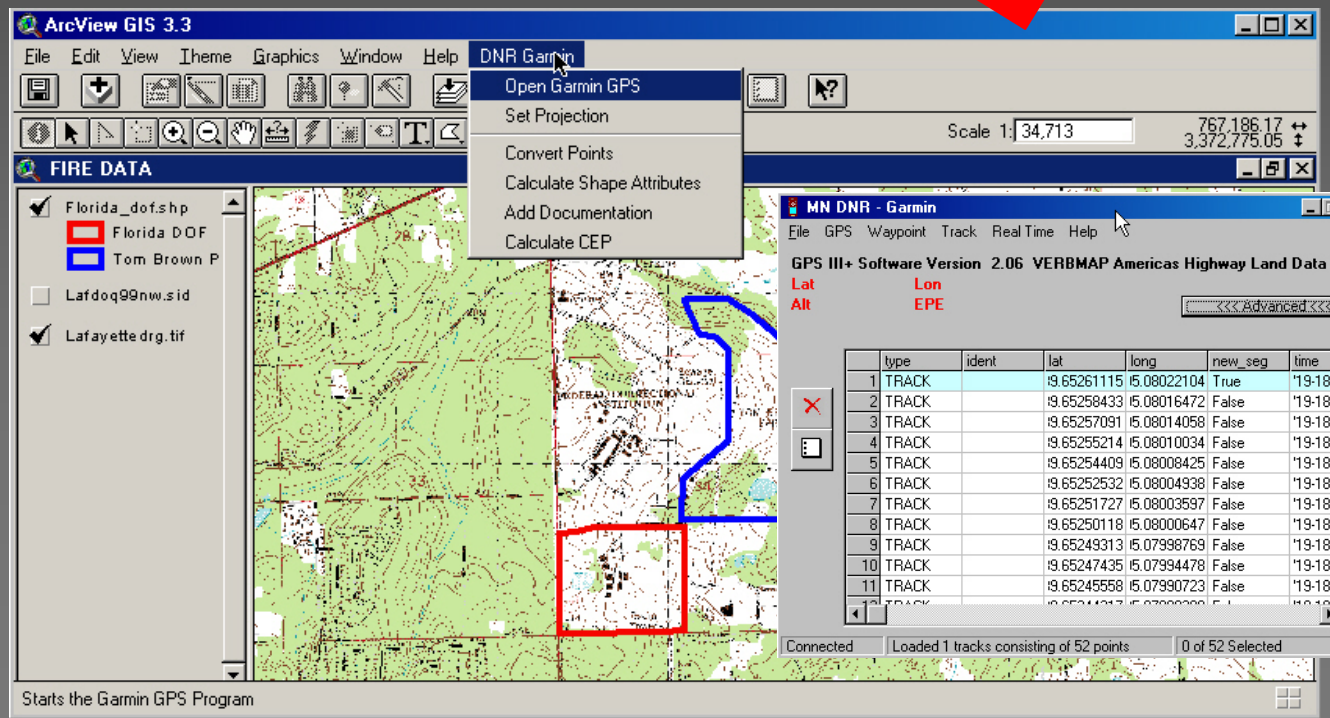


Typical Use on a Fire

- Data Transfer

Download

Upload



Installation Requirements

- Hardware:
  - Garmin GPS III Plus Receiver
  - PC (Windows 95 or higher) with available Serial Port (COM Port)
  - Garmin PC Download Cable
- Software
  - ArcView 3.X
  - DNR Garmin

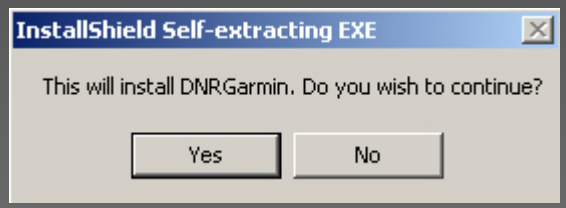
Installation Requirements

- Ensure ArcView 3.X is functioning properly
  - Go To: Start Button | Programs | Esri | ArcView3 | ArcView
  - Confirm ArcView runs
  - Exit Program

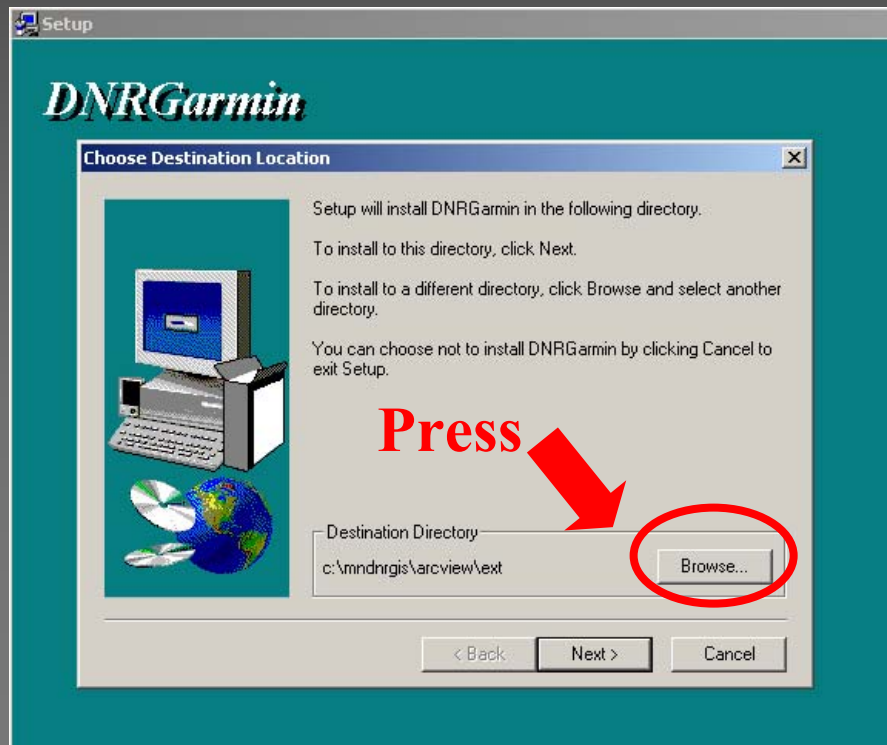
- Proceed to DNR Garmin Installation

DNR Garmin Installation

- Installation
  - Navigate to /Software/DNRGarmin. Find on Training CD or local copy
  - Double-Click GarminSetup.exe



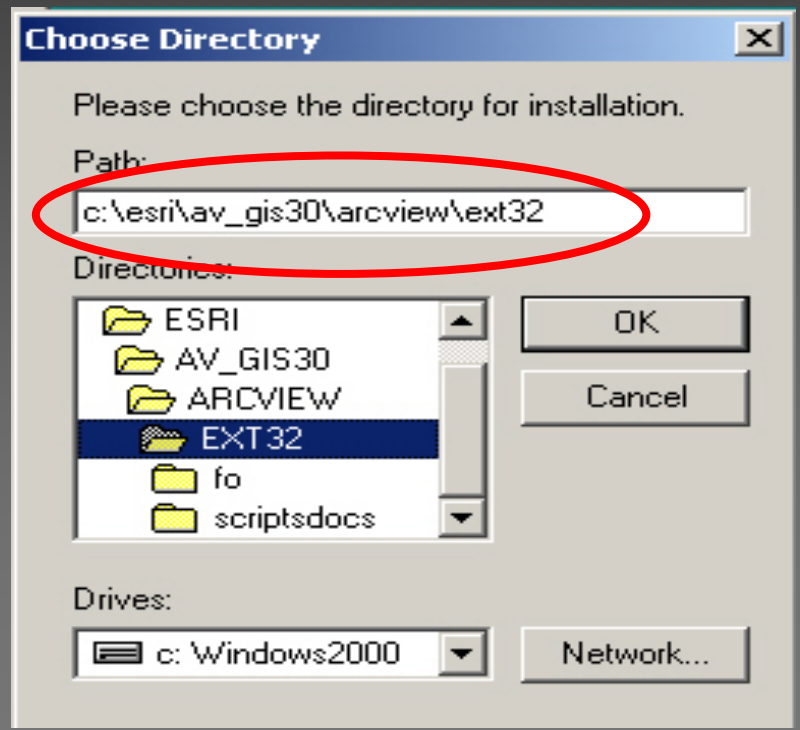
  - Execute the Program



  - Need to Change the Destination Directory
  - Press Browse

Installation

- Download DNR Garmin cont.
  - Navigate to the c:/esri/av_gis30/arcview/ext32 directory*
  - Press OK



- Continue Installation
  - Click Next
  - Accept Typical Installation
  - Click Next to Install

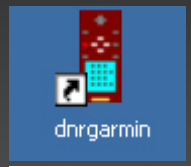
DNR Garmin Summary

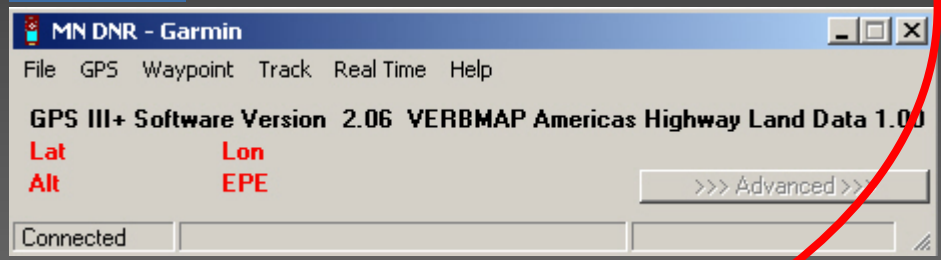
- Overview of DNR Garmin capabilities
- Installed 10 files including ArcView extension and help file in c:/esri/av_gis30/arcview/ext32 directory
- Installed the DNR Garmin program on the PC desktop

- Congratulations!

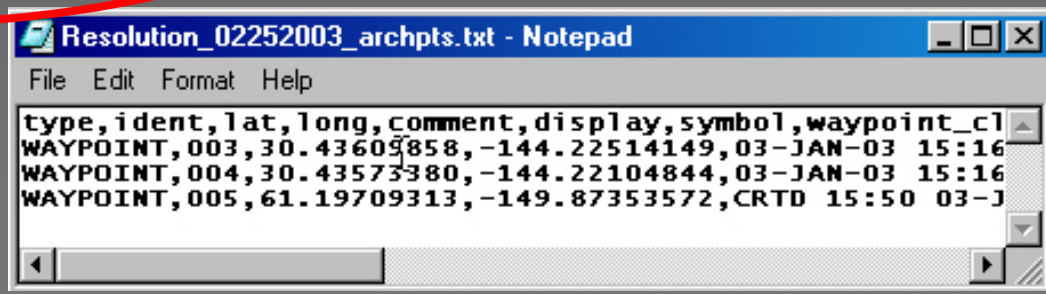
DNR Garmin Program: Download Waypoints

Collect Data





DNR Garmin



Fire Data

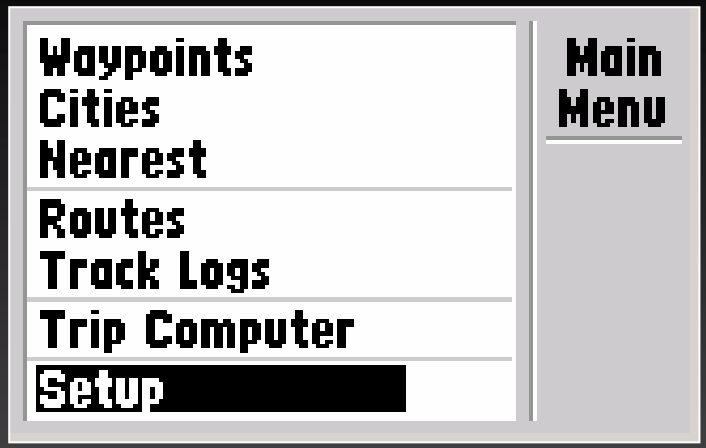
Objectives

- Getting Connected
  - Opening DNR Garmin Outside of ArcView
- Download Waypoints
- Basic Waypoint Table Edits
- Save GPS Data as TEXT File
- Confirm File Naming Convention

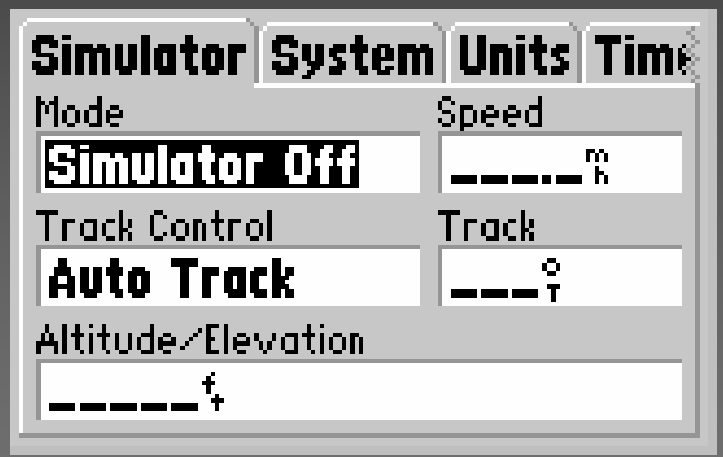
Getting Connected - Step 1

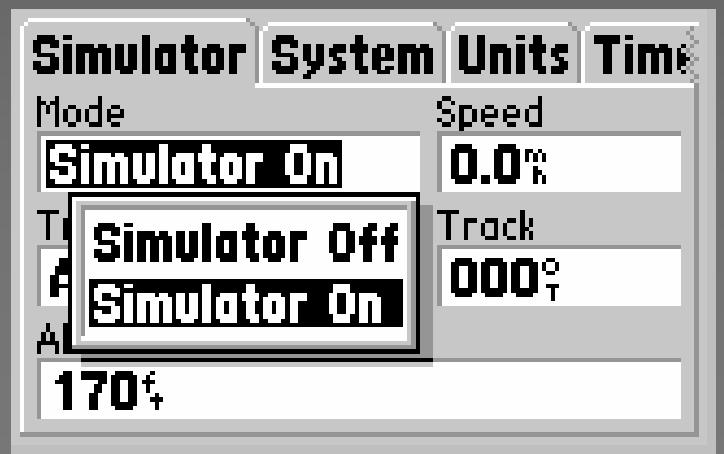
- Connect GPS unit to PC

- Start Receiver
  - Push the ON button
  - Push the MENU button twice
  - Scroll down to SETUP
  - Push ENTER
  - Scroll left to the SIMULATOR tab



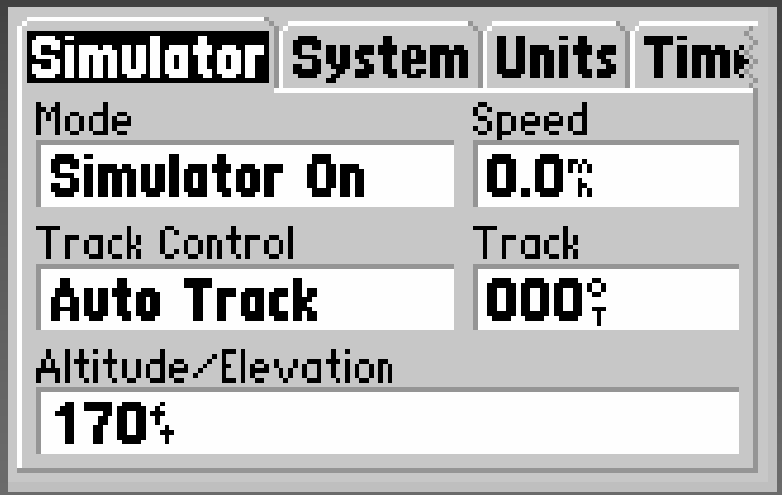
- Change Simulator Mode to On





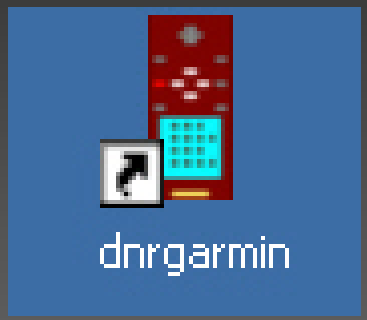
- Check Interface Protocol

- Scroll up to Simulator Tab
- Scroll right to the INTERFACE tab

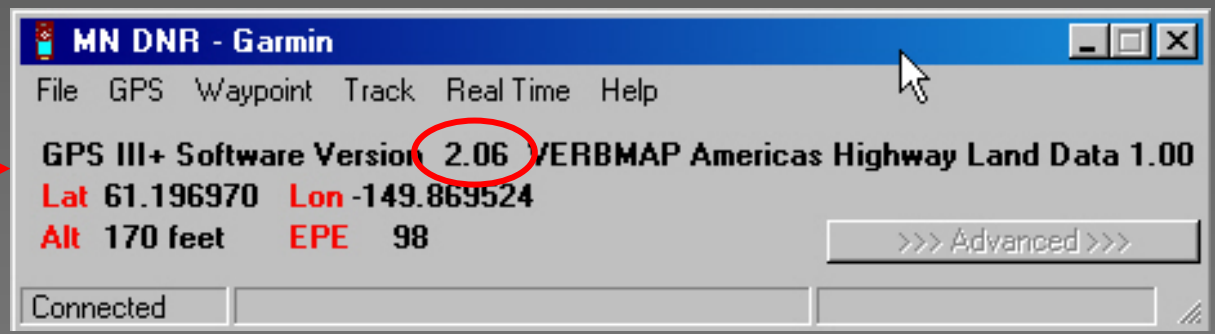


Getting Connected - Step 2

- Double-Click DNRGarmin shortcut on Desktop



VB Program



Current GPS III+ Version Recommended for Class

Troubleshooting Tips

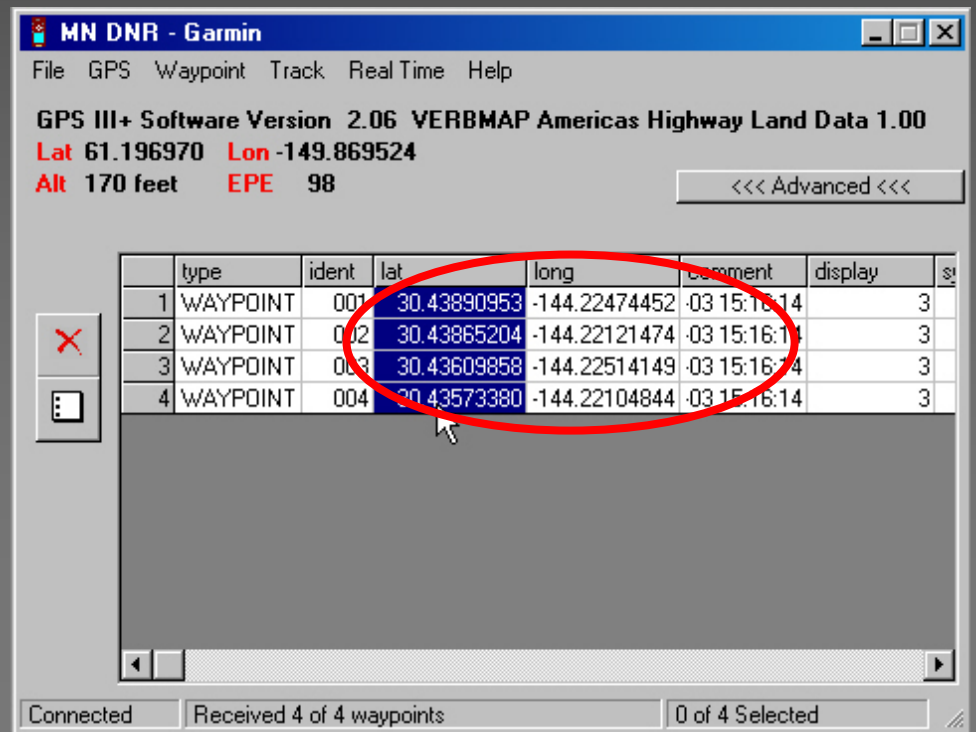
- Check the following if connection cannot be made
  - Cables are securely attached
  - Interface on receiver is set to Garmin

- VB Menu Option GPS
  - These options set up communication protocols with GPS
    - Select GPS | Assign Port and Select other COM port*
    - Select GPS | Open Port to establish connection

* ActiveSync or other peripherals may be using same port

Download Waypoints to Text File

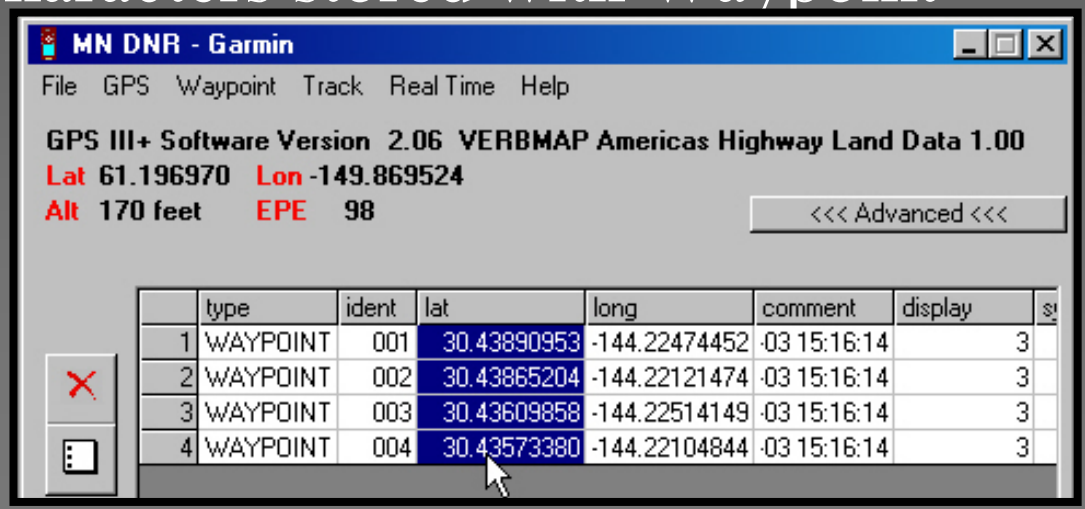
- Select Waypoint | Download
- Click <<<Advanced<<< button to see entire table
- Data is Lat/Long in Decimal Degrees
- Datum is WGS84*



* WGS84 is a result of setting Interface to Garmin and is the native language of GPS

Table Edit Techniques

- Important Fields:
  - TYPE: Type of point this represents
  - IDENT: 6 characters defining name (defaulted here to Garmin's AutoNumber)
  - LAT/LONG: Latitude / Longitude in WGS84 Datum
  - COMMENT: 16 characters stored with Waypoint only



TIP "CRTD" in Comment field stands for Created

Table Edit Techniques

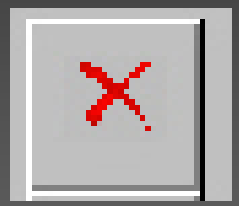
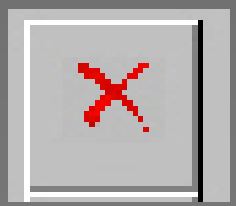
- Editing Table Information
  - Double-Clicking on Cell - Modifies Cell Value

  - Deleting Records

  - Deleting Columns

  - To Select multiple columns or rows, hold down mouse and drag

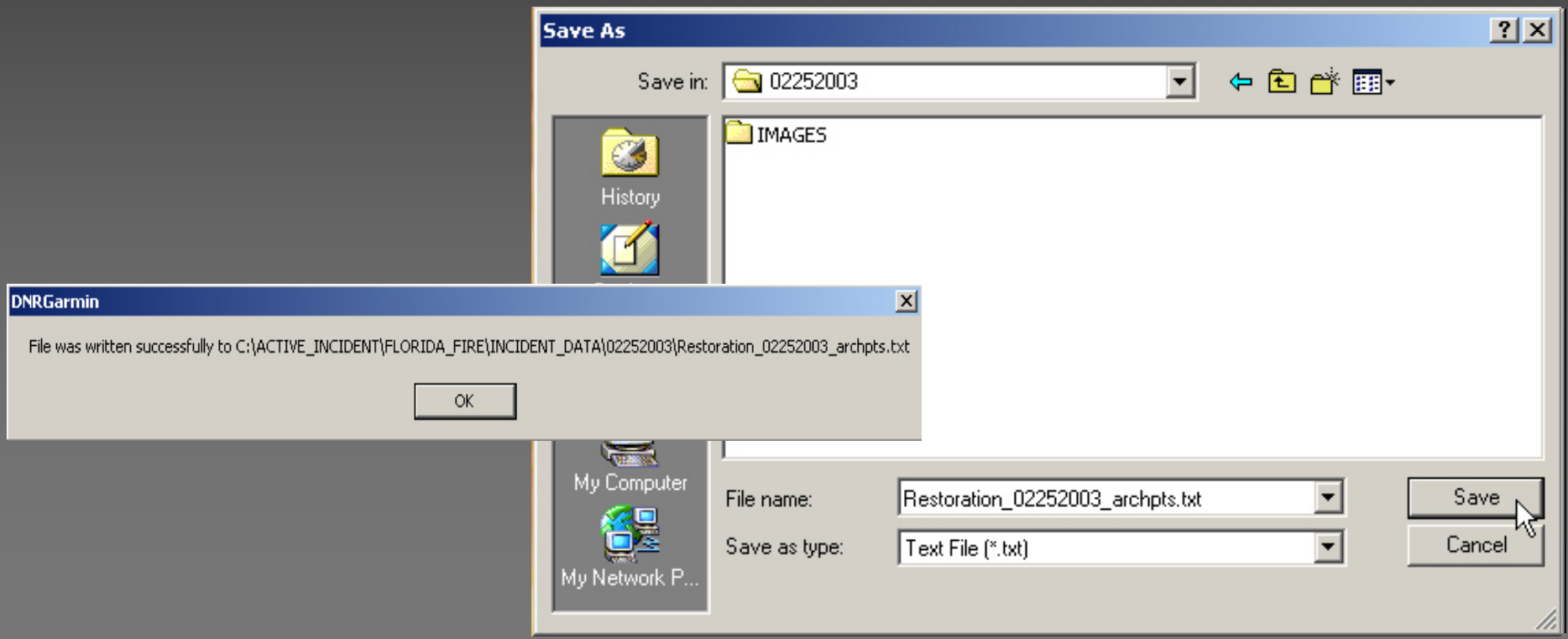
Table Edit Techniques

- Edit Restoration Fire Scenario Data
  - Delete 2nd Archeological Site (remove row two)
    - Highlight Row 2
    - Click  to delete selected row
  - Delete extraneous column data
    - Highlight "unused1" column
    - Left mouse drag left to "depth"
    - Click  to delete selected columns

Save Waypoints to Text File

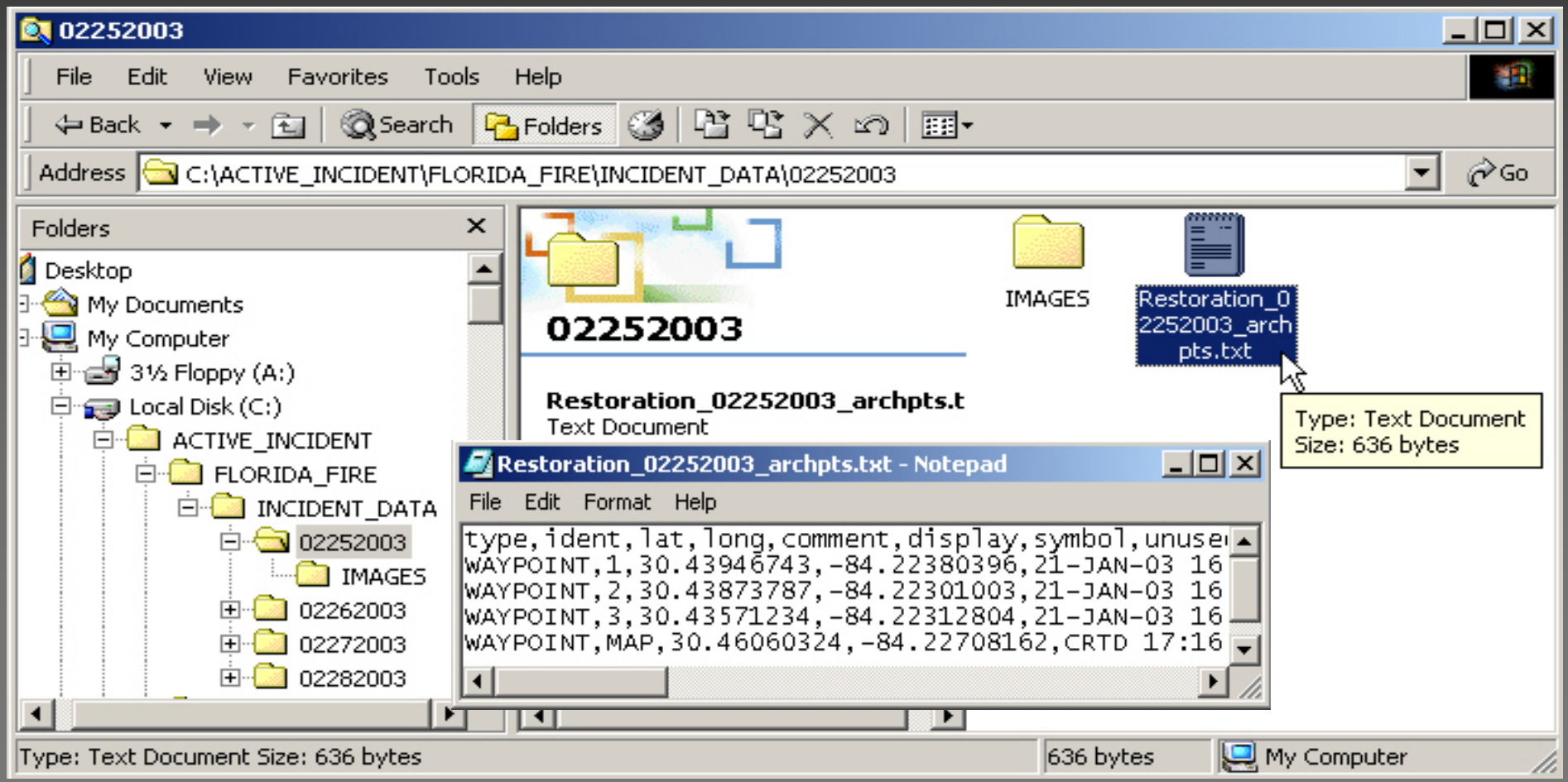
- Select File | Save As | GPS Text File...

- Save As: See Instructors Guidelines



Confirm Directory Structure

– Example shown here for the Restoration Fire at Tallahassee Florida Training



Review

DNR Garmin is two programs in one

1.) VB Program outside of ArcView

2.) ArcView 3.x extension

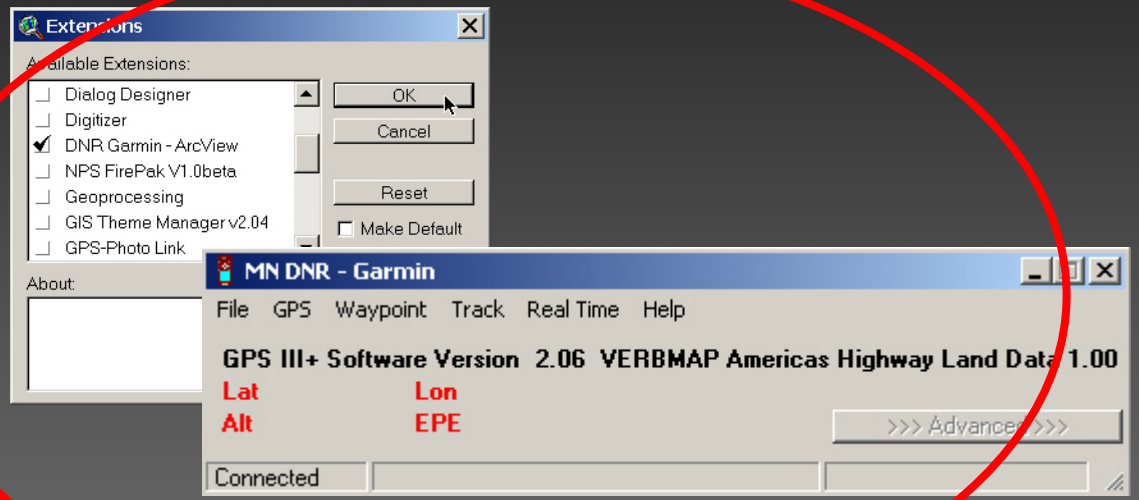
- VB Program can save .txt file or shapefile
  - coordinates in Latitude/Longitude Decimal Degrees, WGS84 datum ONLY
- ArcView extension can save as graphic or shapefile
  - has shapefile projection and datum change capabilities

Summary

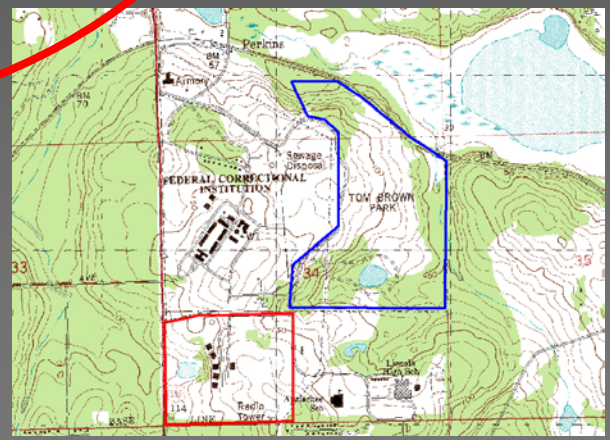
- Connected successfully to the GPS
- Used DNR Garmin Program
  - Outside of ArcView
- Edited simple Waypoint Data
- Saved as Text File
- Confirmed location of file on PC

DNR Garmin Extension in ArcView: Set up

Collect Data



DNR Garmin



ArcView

Objectives

- Getting Connected
  - Open ArcView a new project
  - Set View Properties
  - Load the DNR Extension
  - Opening DNR Garmin Inside of ArcView
- Overview Menu Options
- Help Review

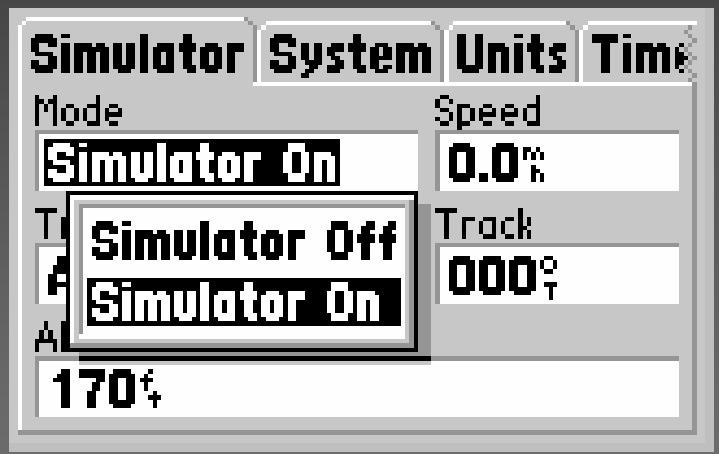
Getting Connected - Check

- Turn on Garmin GPS

- For best results, the Garmin GPS should be connected to the computer via a serial cable and turned on before loading the DNR Garmin extension.

Getting Connected - Check

- Simulator Mode to On



TIP Garmin GPS returns to Simulator Off during power up

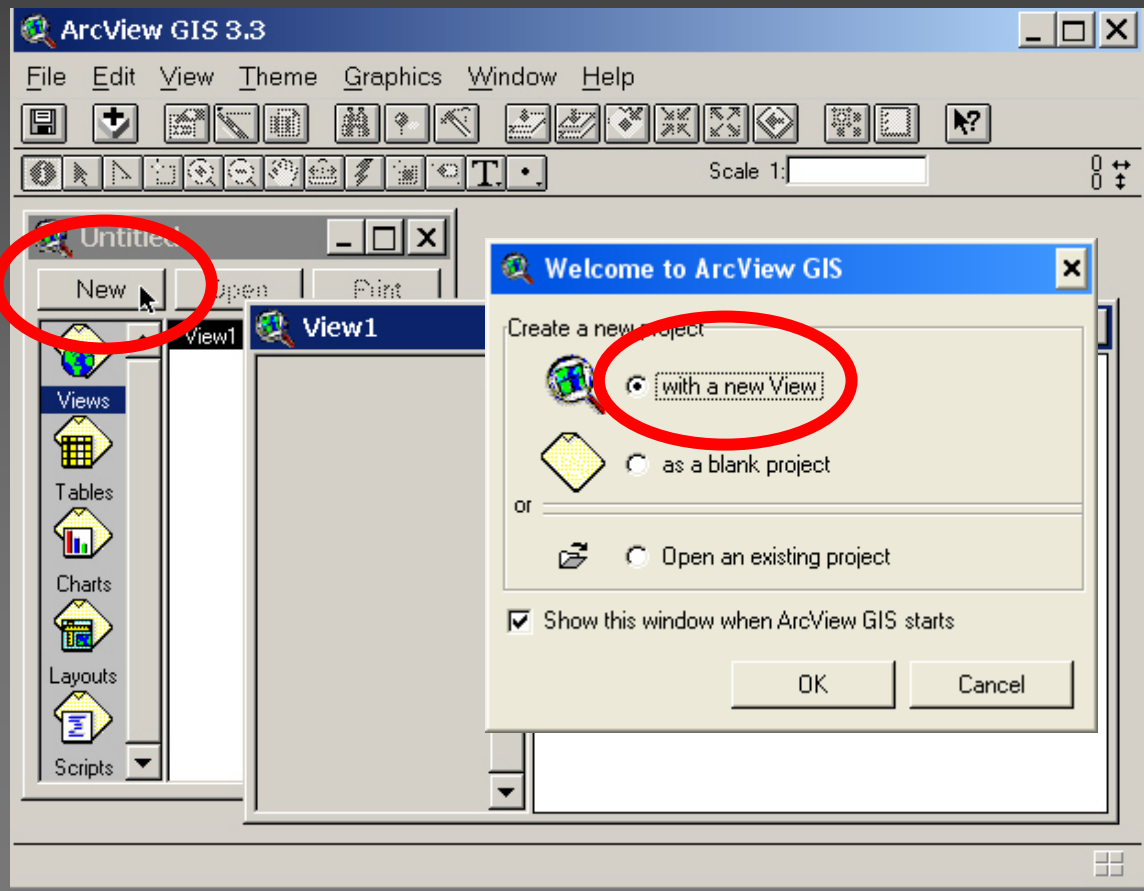
Getting Connected - Step 1

- Start ArcView
  - Start Button| Programs | ESRI | ArcView3 | ArcView

- Open an ArcView
  - New View

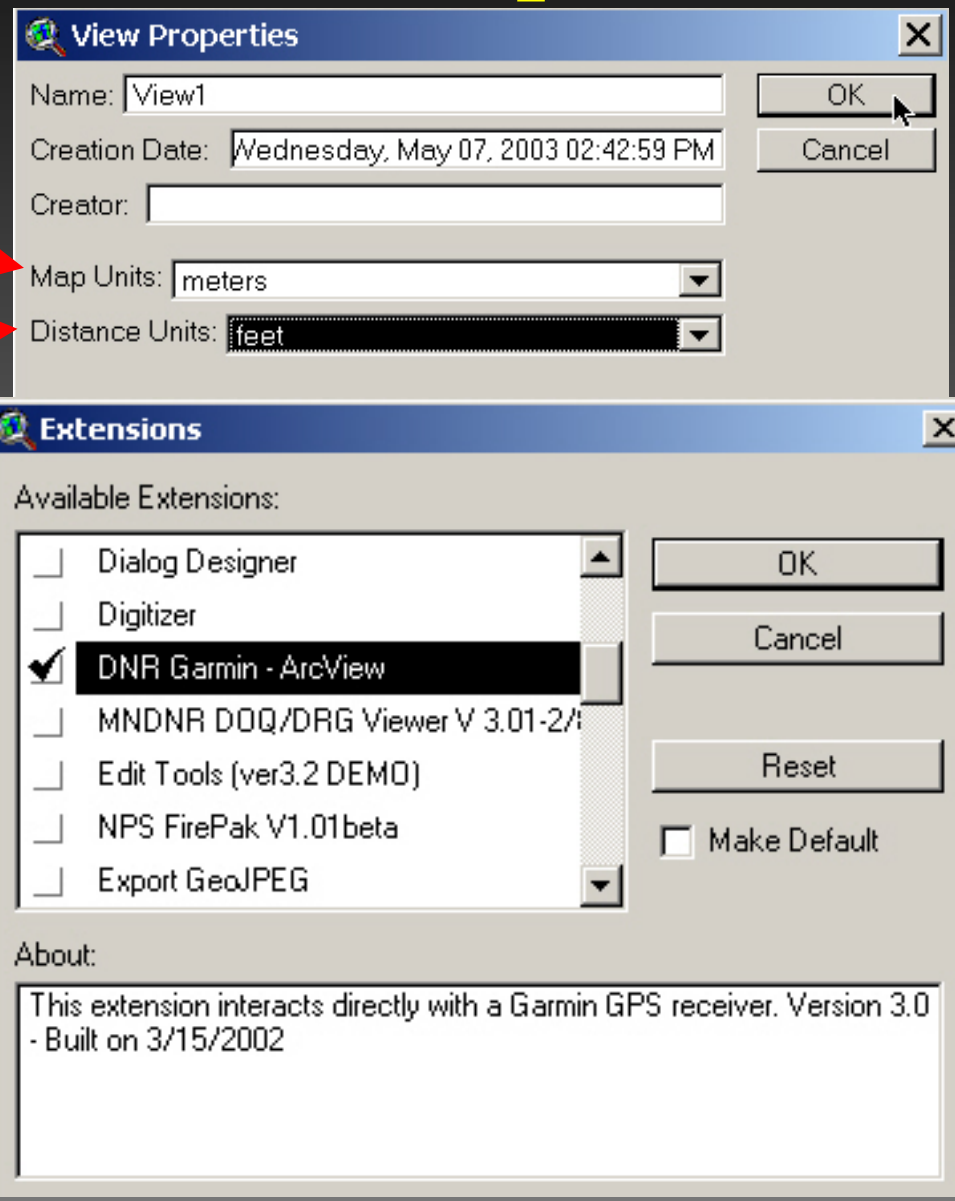
  Or…

  - "with a new View" when dialog box inquires



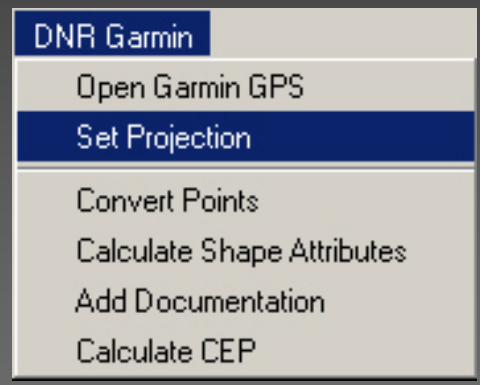
Getting Connected - Step 1

- Set View | Properties
  - Map Units: meters
  - Distance Units: feet
- Load DNR Garmin Extension
  - Select File | Extensions...
  - Scroll to Select
    "DNR Garmin - ArcView"
  - Press OK

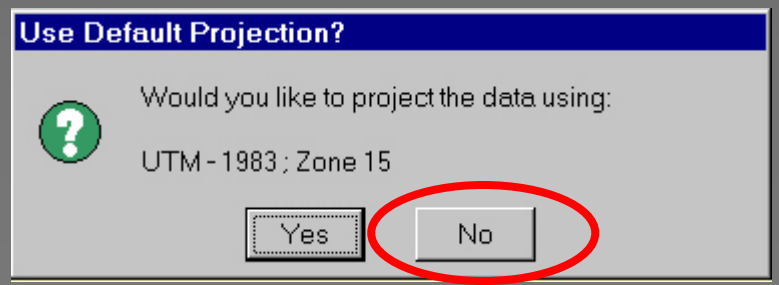


Getting Connected - Step 2

- Set Projection
  - Since some of you may already have loaded DNR Garmin, we need to ensure the Projection is set
  - Select DNR Garmin | Set Projection

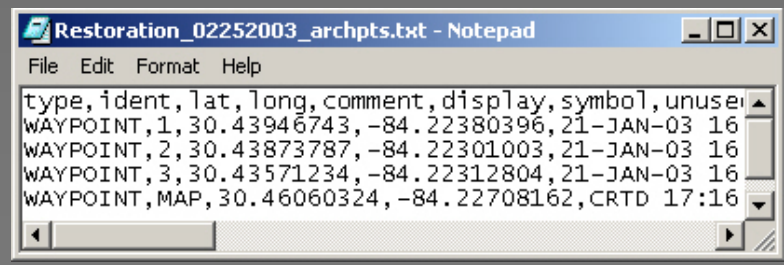


  - This may not be the correct projection and datum, Press NO
  - Set parameters to the Class Instructions



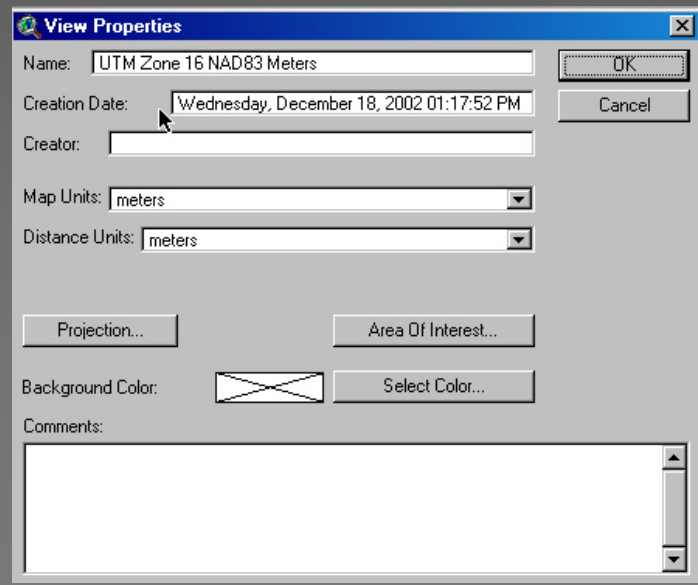
Projections - What's the big deal anyway!

- To GIS personnel - this is a big deal
- Intimately linked to the data collection from the field
- Ask how the GIS personnel prefers the data
- All raw GPS data is expressed in Lat/Long Decimal Degrees - WGS84 Datum
  - Setting Garmin to Garmin Protocol ensures data arriving in downloaded as DD WGS84



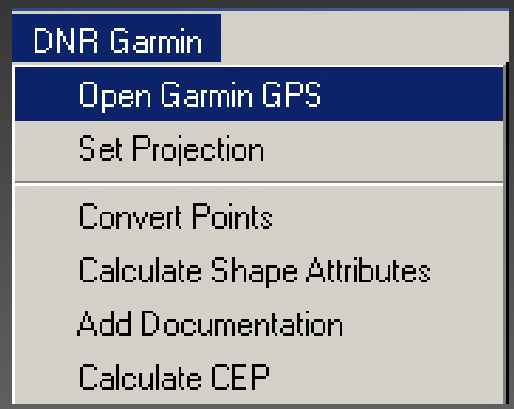
Projections - What's the big deal anyway!

- When GPS data is downloaded to ArcView the data is projected "on the fly" using the projection you define using:
  - DNRGarmin | Set Projection Dialog box
  - Information is stored in a file and can be reset at any time
- This assumes the base data is projected and is being displayed in an unprojected View.

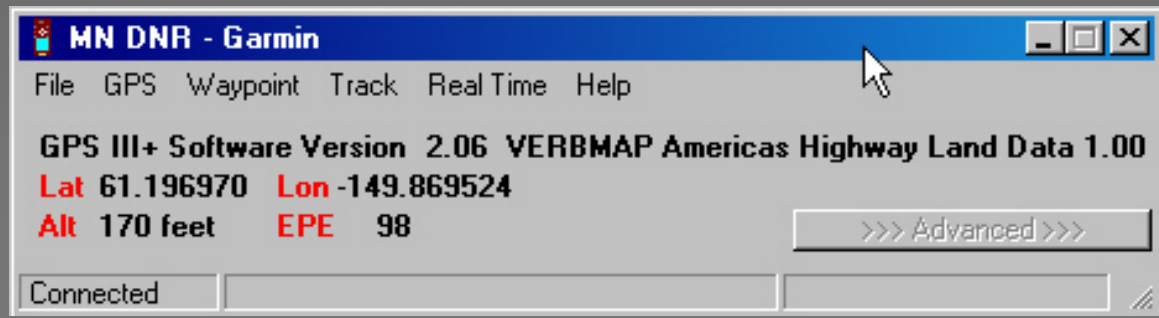


Getting Connected - Step 3

- Open DNR Garmin - Select DNR Garmin | Open Garmin GPS



- If GPS is turned on you will see this
- Congratulations!

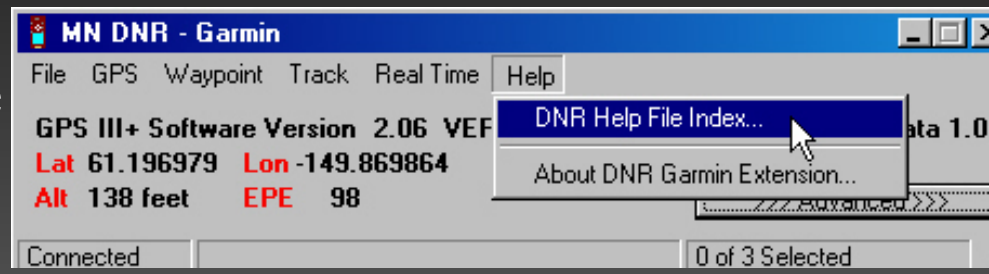


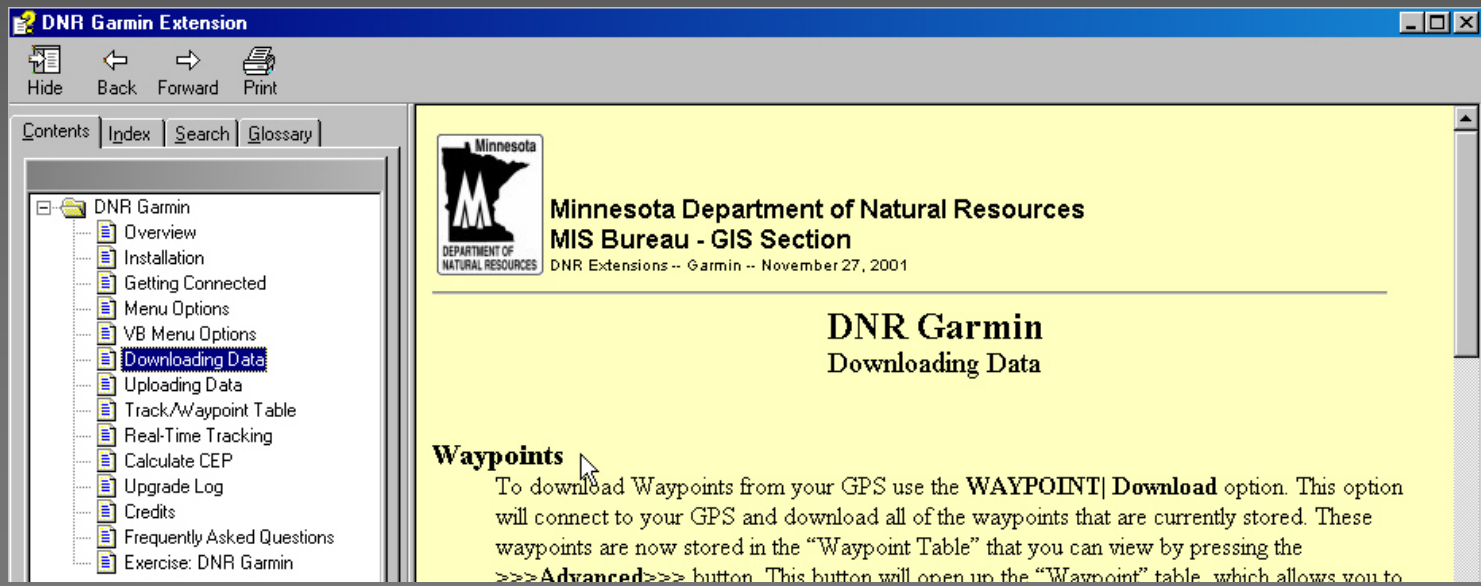
Overview DNR Garmin Menu

- OPEN Garmin GPS: Starts the DNR Garmin Program
- Set Projection: Sets the Projection for Incoming Data
- Convert Points: Convert Point shapefile to line or polygon
- Calculate Shape Attributes: Calculates attributes of shapefile (GIS units) and adds them to the attribute table.
- Add Documentation
- Calculate CEP: Calculates Circular Error Probability for the Selected Point Theme

DNR Garmin Help

- Open DNR Help
- Select Help | DNR Help File Index
- Select “Downloading Data” from the Contents Tab
- Close Help



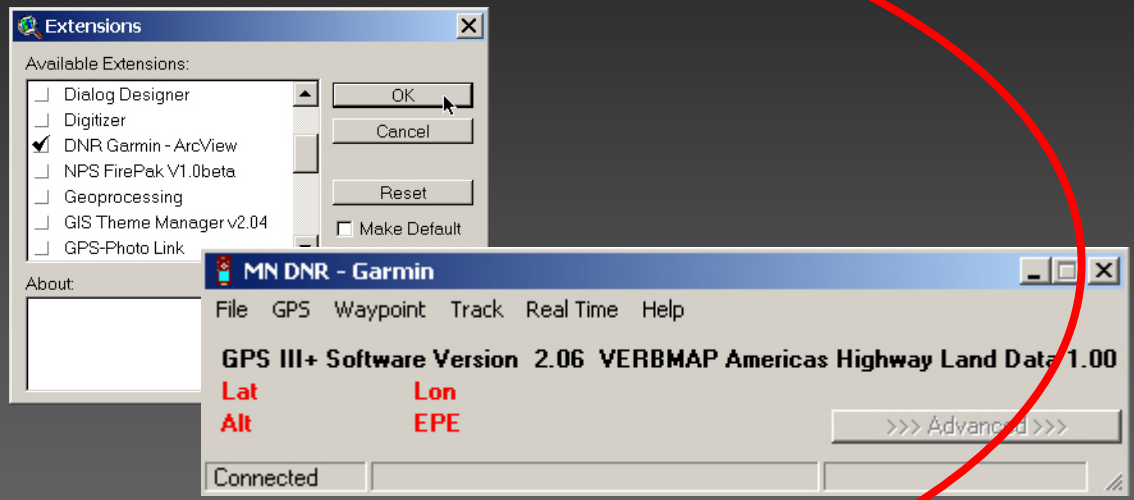


Summary

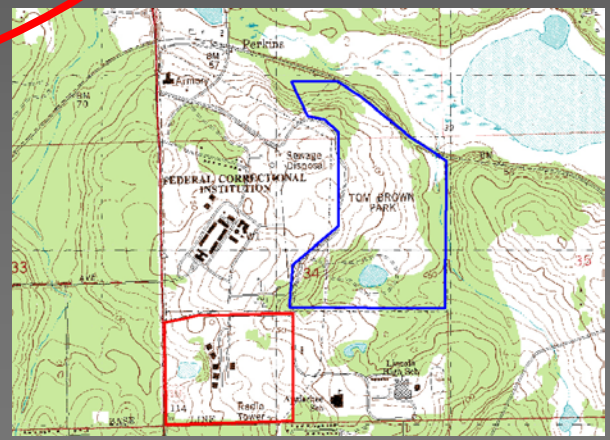
- Connected successfully to the GPS
- Used DNR Garmin Program (extension)
  - INSIDE of ArcView
- Reviewed basic capabilities in DNR Garmin Menu
- Launched DNR Garmin Help

DNR Garmin & ArcView: Waypoint and Track Download

Collect Data



DNR Garmin



ArcView

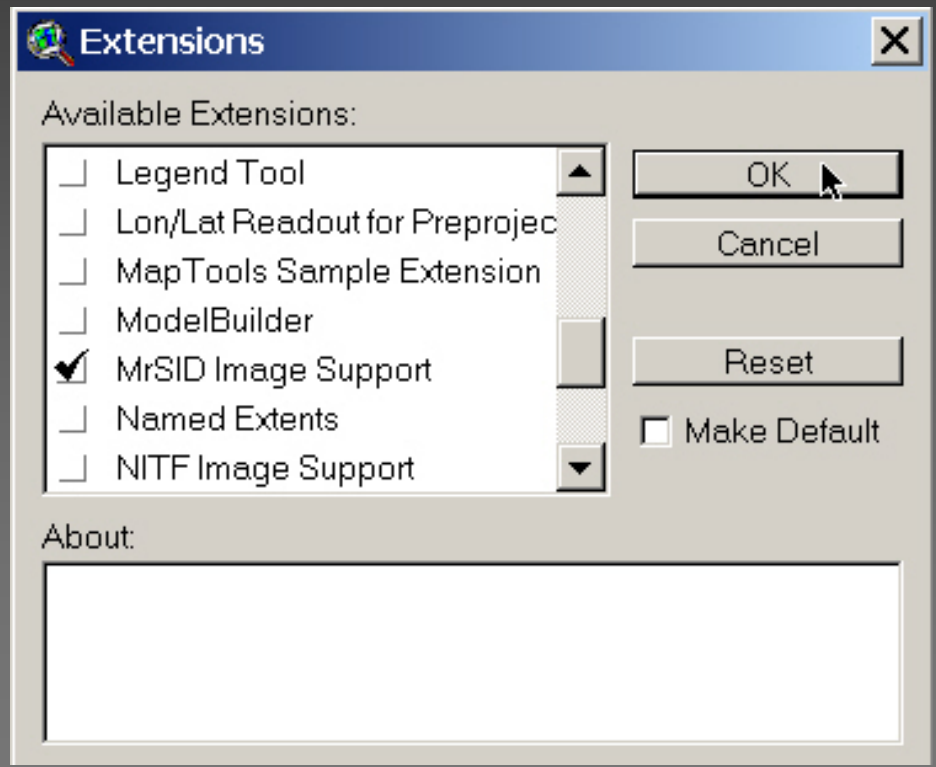
Objectives

- Add Themes to View
- Download Waypoints and Tracks with the DNR Garmin extension in ArcView
- Basic Waypoint and Track table edit with DNR Garmin
- Save Waypoints and Tracks as ArcView Shapefiles

Add Themes to View

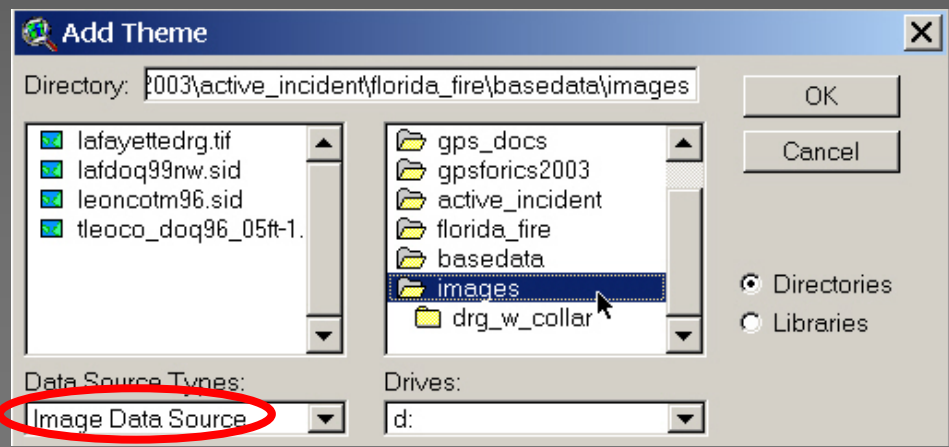
- We can add an image theme (background) to the view
- Load MrSID Extension
  - Select File | Extensions...
  - Scroll to Select

    "MrSID Image Support"
  - Press OK



Add Themes to the View

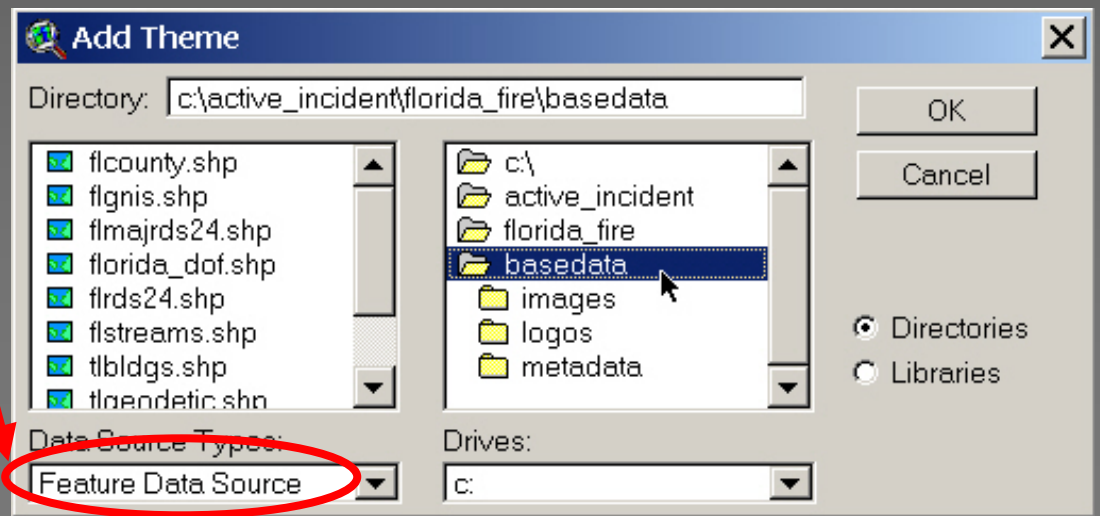
- Add Image Themes from Incident Folder
  - Add Theme Button  or...
  - View | Add Theme
  - Look in ACTIVE_INCIDENT/BASE DATA/**IMAGES** folder
  - Change Data Source Type to Image Data Source
  - Add themes (e.g., **wicadrg.sid**, **wicadoqq.sid**)



Add Themes to the View

- Add Vector (feature) Themes from Incident Folder
  - Add Theme Button  or...
  - View | Add Theme

  - Look in ACTIVE_INCIDENT/BASE DATA/**SHAPEFILES** folder for feature data
  - Add theme (e.g., wicatrll.shp)
  - Add others



Download Waypoints into ArcView

- Select Waypoint | Download
- Click <<<Advanced<<< button to see entire table

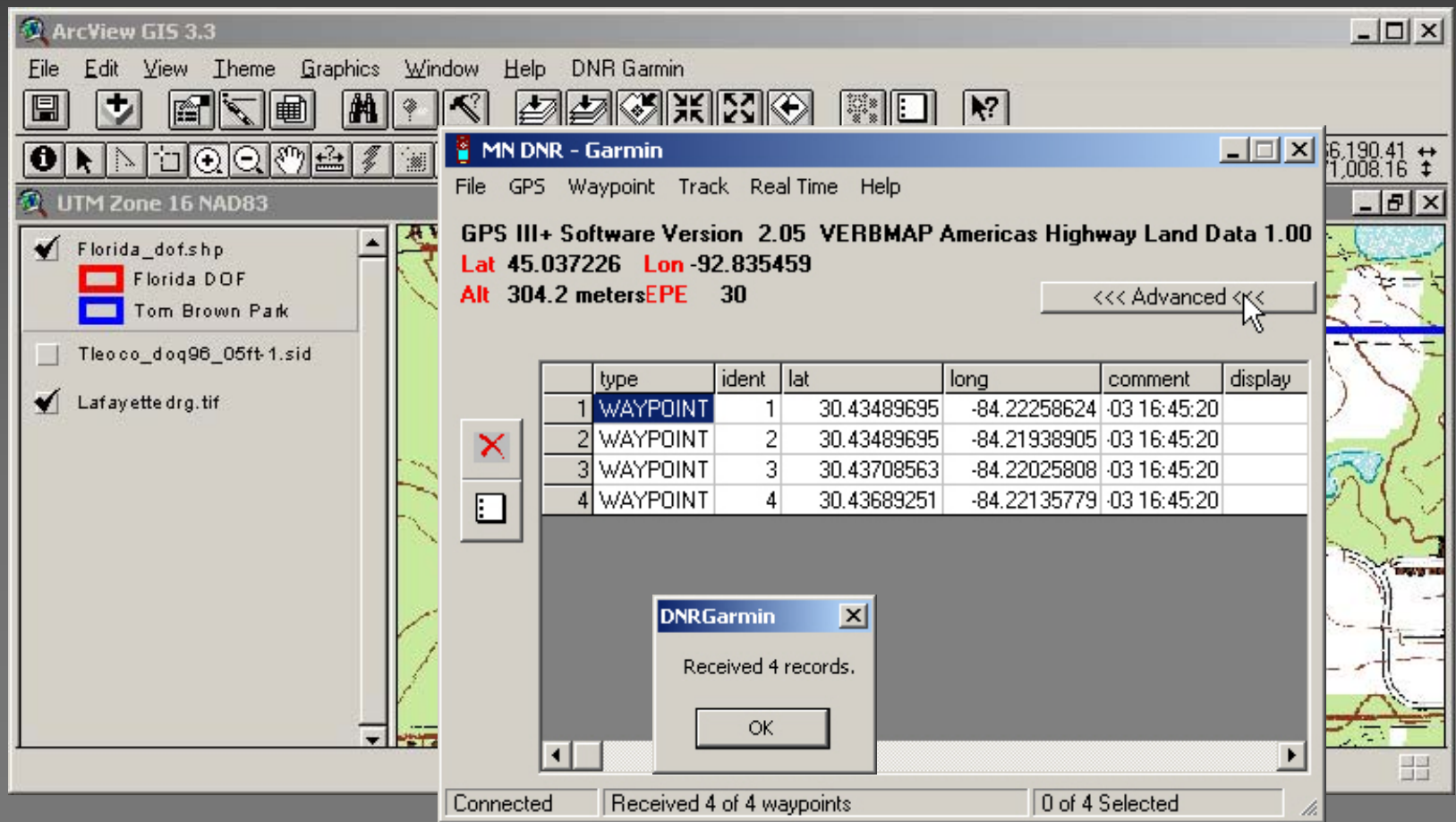
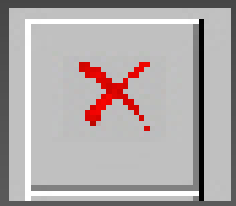
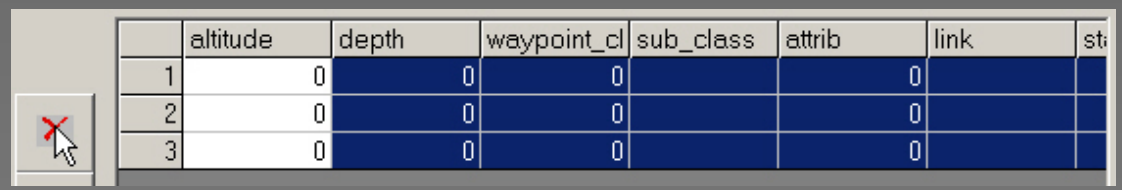


Table Edit Techniques

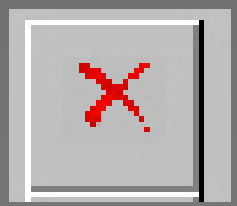
- Edit Waypoint Data
  - Delete 2nd Archeological Site (Remove Row two)
    - Highlight row

	type	ident	lat	long	comment	display	sym
1	WAYPOINT	1	30.43489695	-84.22258624	-03 16:45:20	3	
2	WAYPOINT	2	30.43489695	-84.21938905	-03 16:45:20	3	
3	WAYPOINT	3	30.43708563	-84.22025808	-03 16:45:20	3	
4	WAYPOINT	4	30.43689251	-84.22135779	-03 16:45:20	3	

    - Click  to delete selected row
  - Delete extraneous column data
    - Highlight “unused1” column
    - Left mouse drag left to “depth”

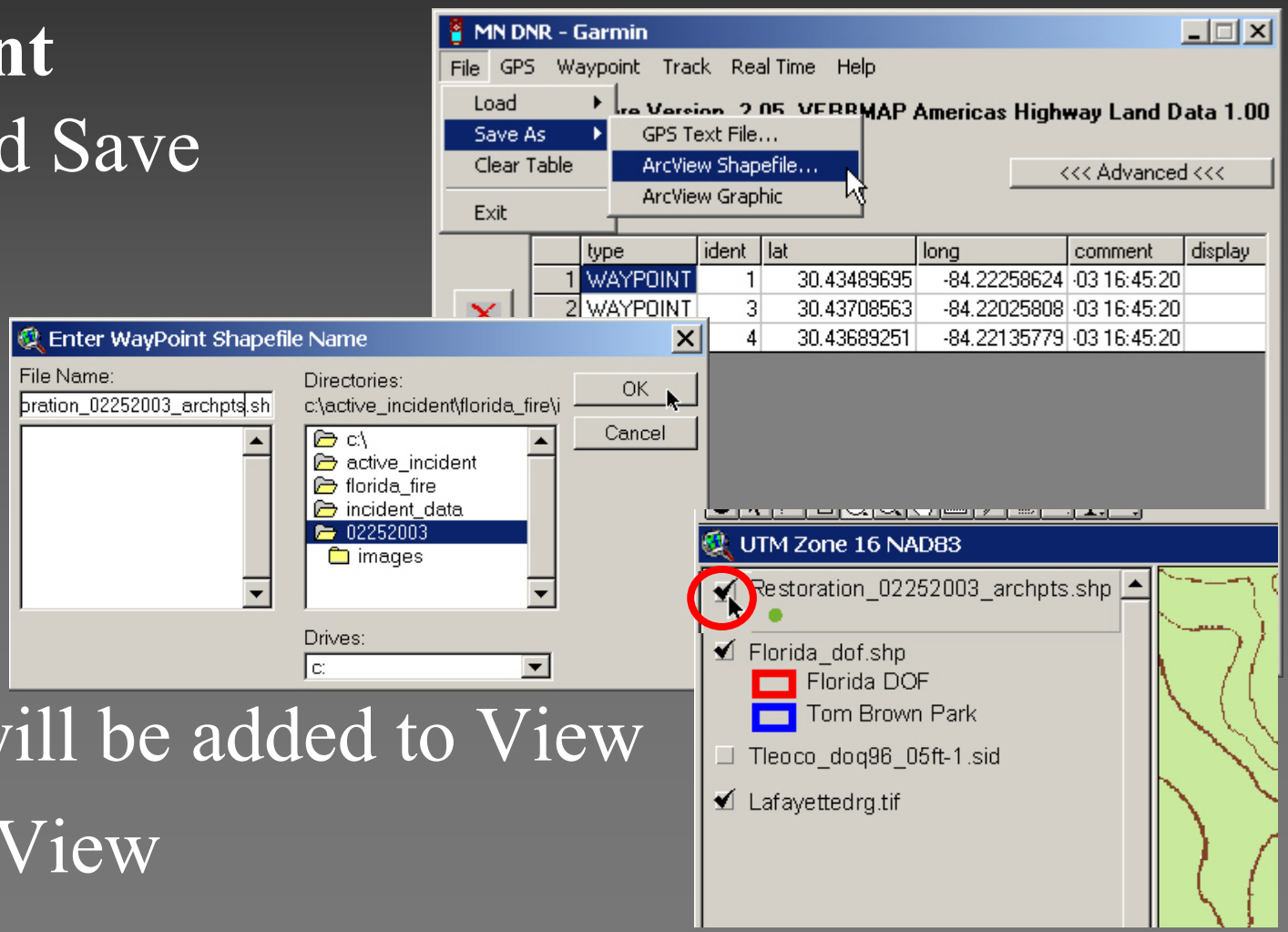


	altitude	depth	waypoint_cl	sub_class	attrib	link	st
1	0	0	0		0		
2	0	0	0		0		
3	0	0	0		0		

    - Click  to delete selected columns

Save as ArcView Shapefile

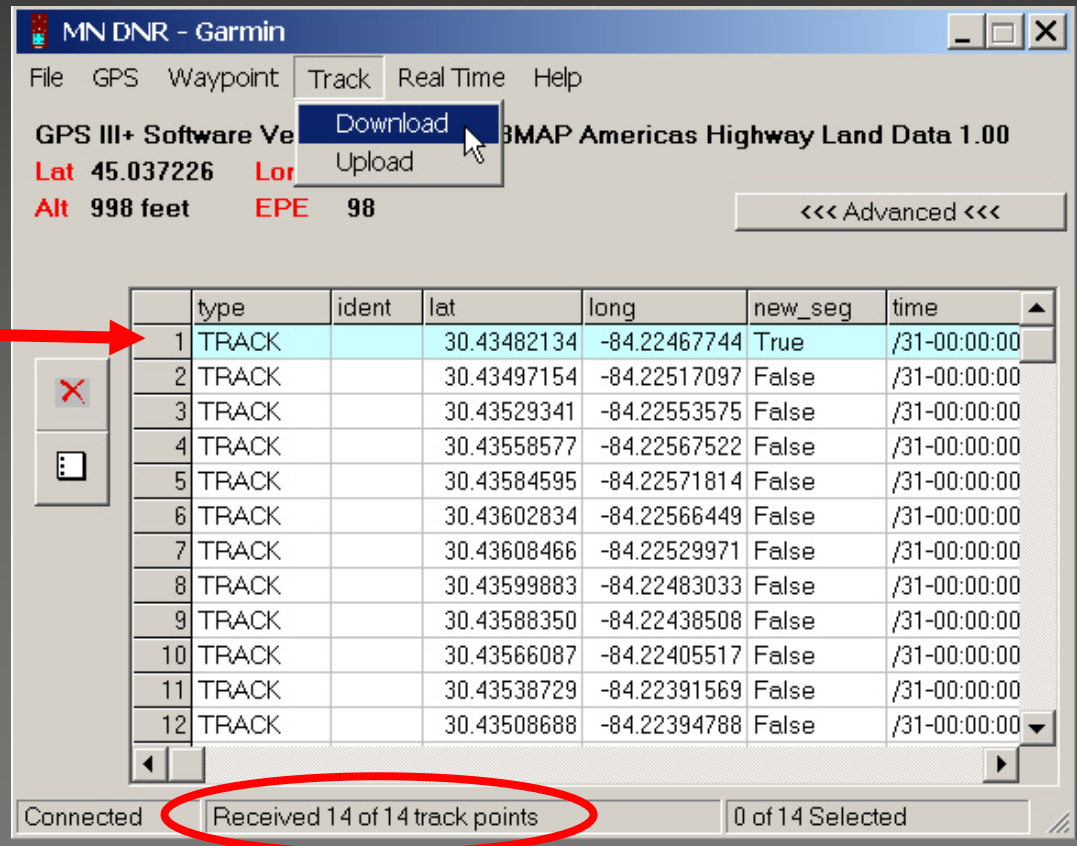
- Select File | Save As | ArcView Shapefile
- Output **Point**
- Rename and Save Shapefile



- Shapefile will be added to View
- Turn on in View

Download Track into ArcView

- Select Tracks | Download
- <<<Advanced<<<

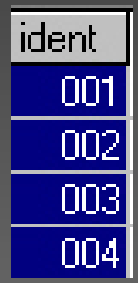


What's with the blue?

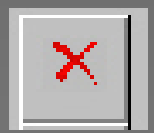
This is an indication of a "new" track. This signifies a break in sequence of track point data collection based on date and/or time.

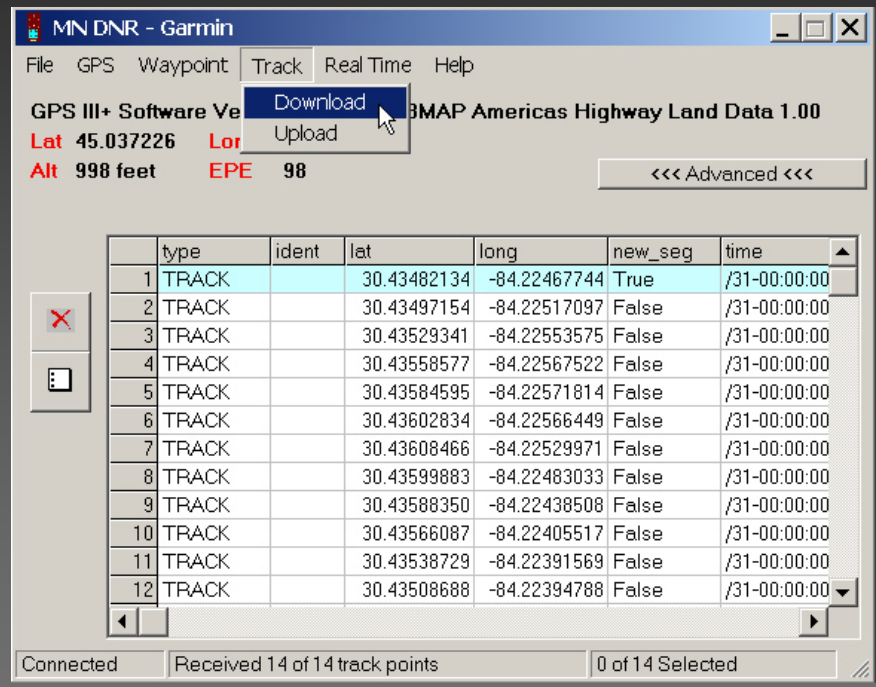
Download Track into ArcView

- Delete Track Data
  - Delete extraneous columns
    - Highlight column



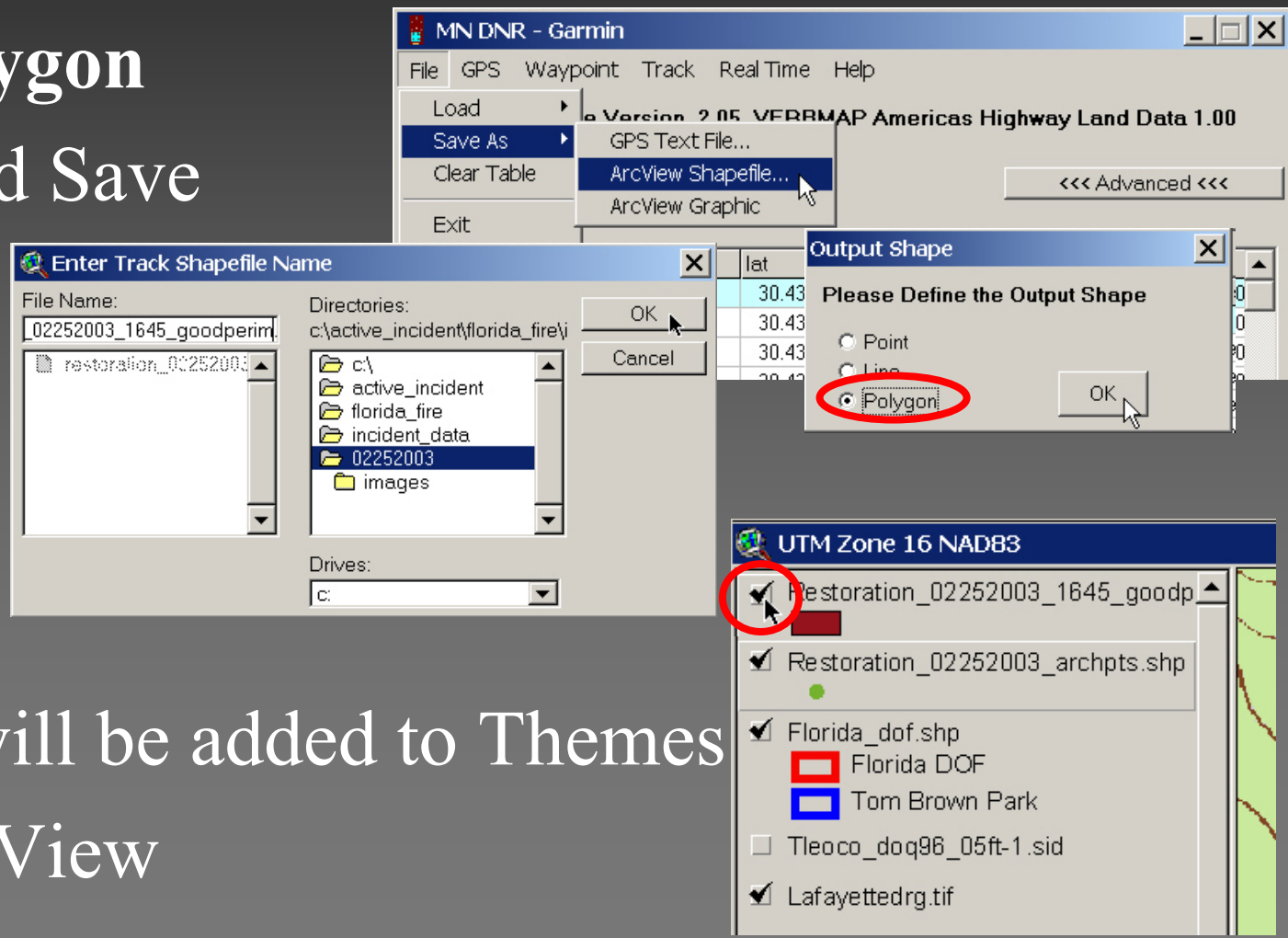
    - Left mouse drag for multiple selection

    - Click  to delete selected columns



Save as ArcView Shapefile

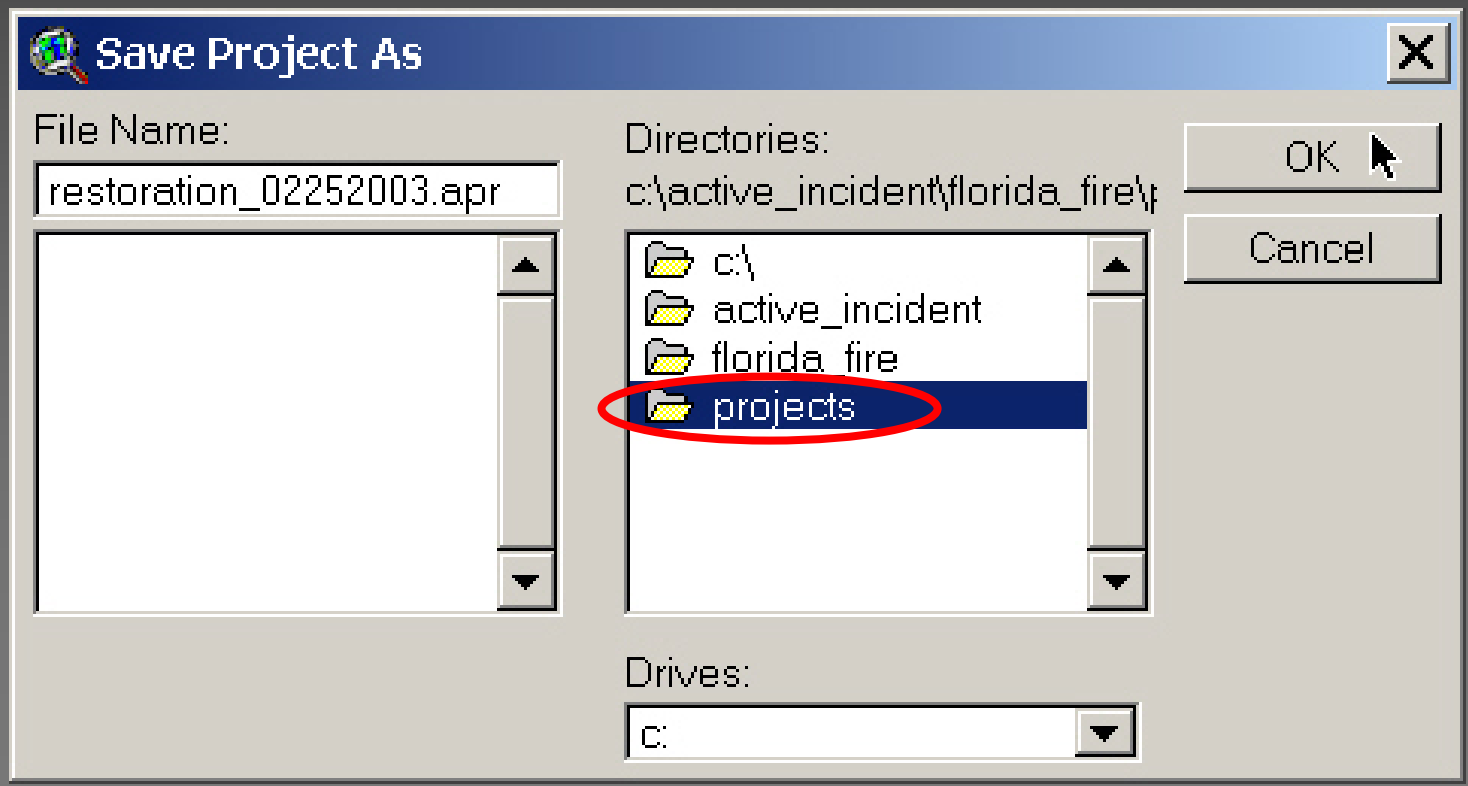
- Select File | Save As | ArcView Shapefile
- Output **Polygon**
- Rename and Save Shapefile



- Shapefile will be added to Themes
- Turn on in View

Save ArcView Project

- File | Save Project As…
  - Browse to Projects folder
  - Name with incident name and date
  - OK

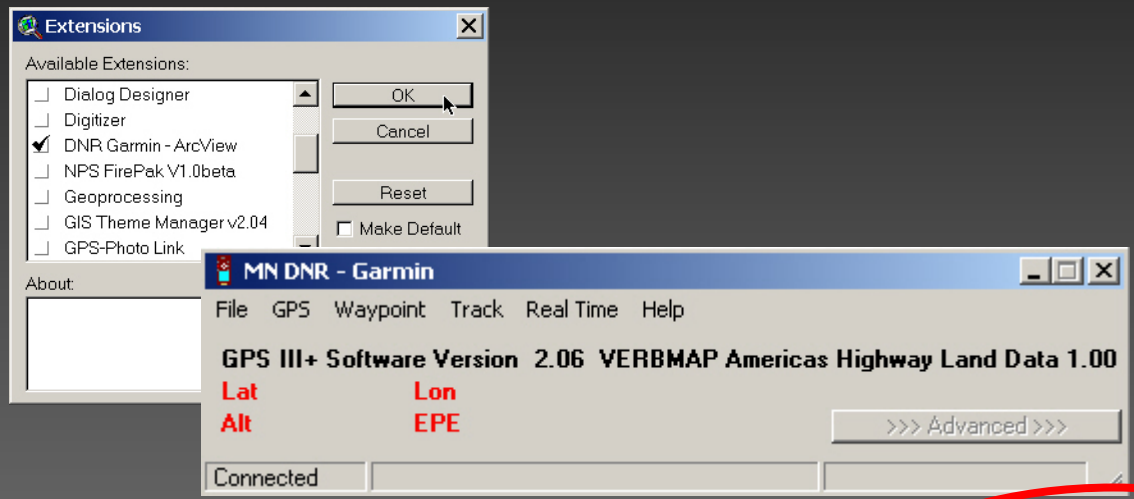


Summary

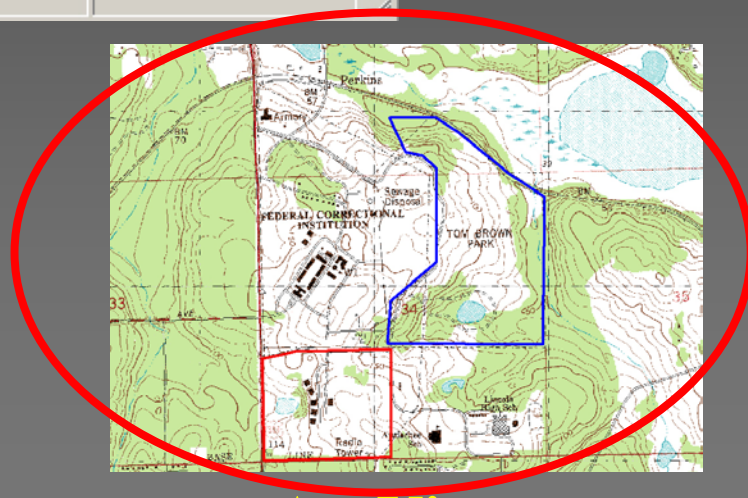
- Added Themes to View
- Downloaded Waypoints and Tracks with the DNR Garmin extension in ArcView
- Edited the Waypoint and Track tables with DNR Garmin
- Saved Waypoints as ArcView Point Shapefile and Track as ArcView Polygon Shapefiles

ArcView: Basic Editing

Collect Data



DNR Garmin



ArcView

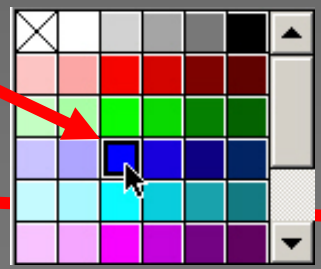
Objectives

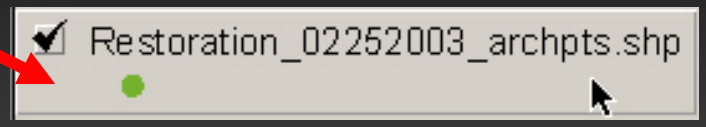
- Edit the View legend for point and polygon themes
- Calculate attributes for shapefile with DNR Garmin
- Document shapefiles with DNR Garmin
- Print or save a “map”
- Install AlaskaPak Extension
- Turn on AlaskaPak in ArcView
- Calculate Polygon Acreage and Perimeter Miles
- Create a Layout with the AlaskaPak Layout Wizard

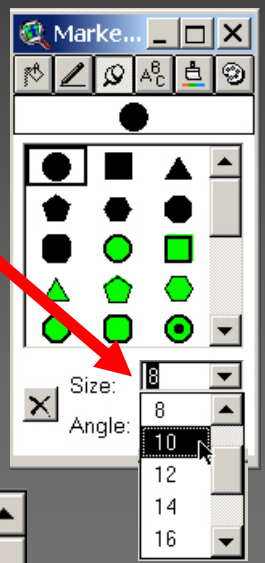
Edit Legend: Point Theme

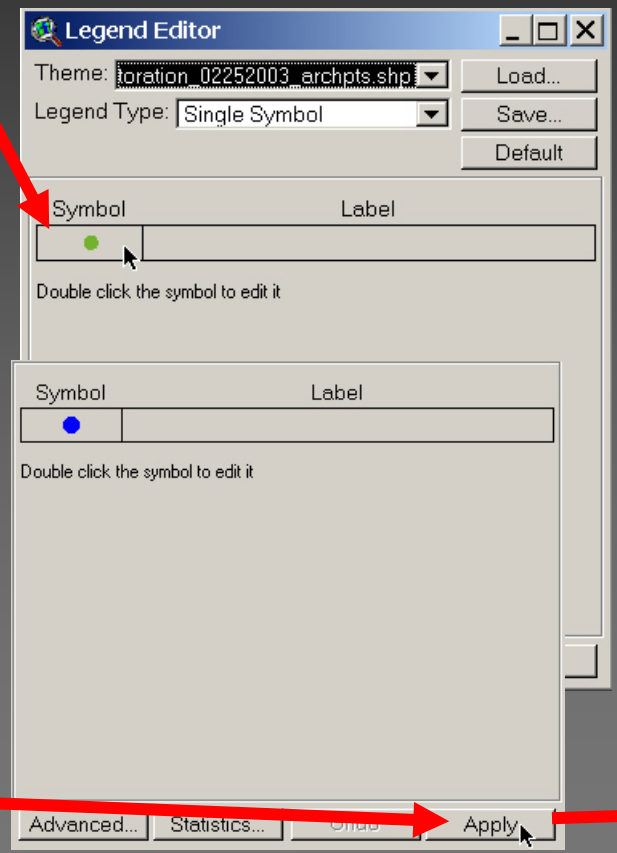
- Double click on Point theme
- Double click on symbol to Edit
- Change point size
- Click on Paint Brush

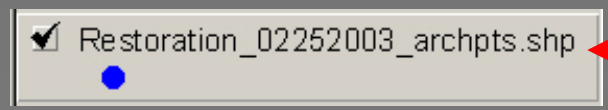
- Change color
- Apply





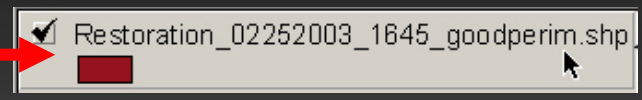


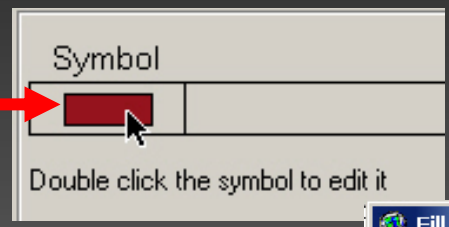


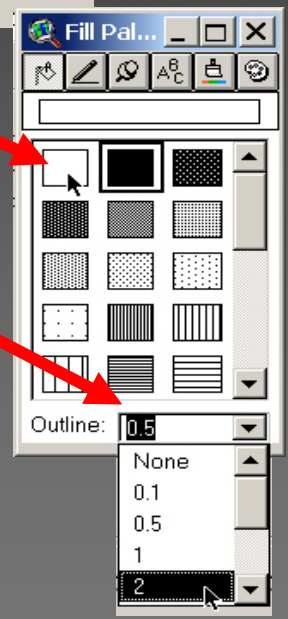


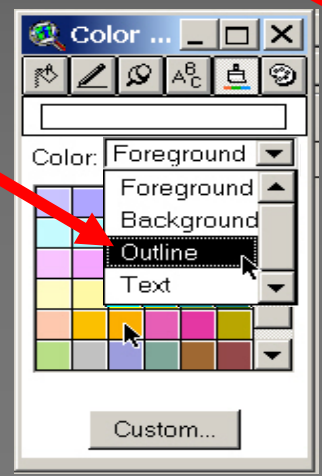
Edit Legend: Polygon Theme

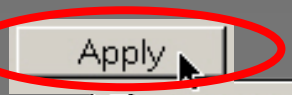
- Double click on theme in legend
- Double click on symbol to Edit
- Use the Fill Palette to change the fill to transparent and thicken outline
- Click on Paint Brush button
- Use the Color Palette to change Outline color
- Apply

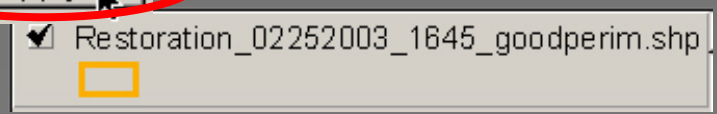








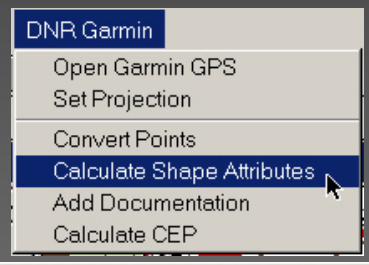




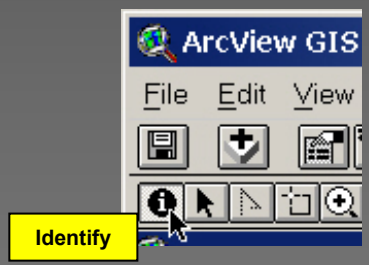
DNR Garmin: Attribute Shapefiles

- Make polygon shapefile the active (raised) theme

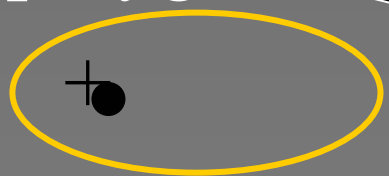
- DNR Garmin | Calculate Shape Attributes



- Use identify button to show attributes

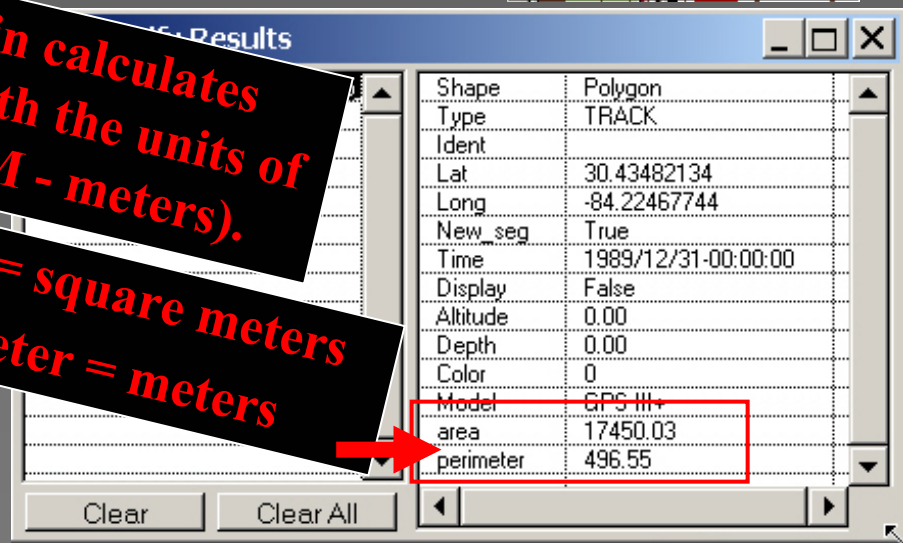


- Click inside polygon



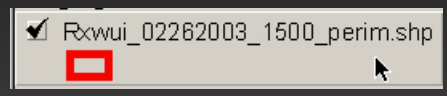
DNR Garmin calculates attributes with the units of the GIS (UTM - meters).

Area = square meters
Perimeter = meters

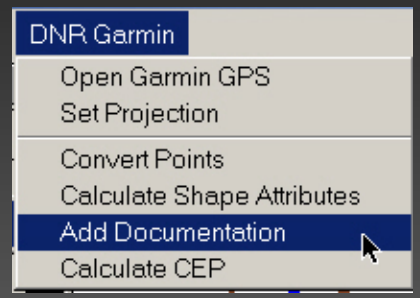


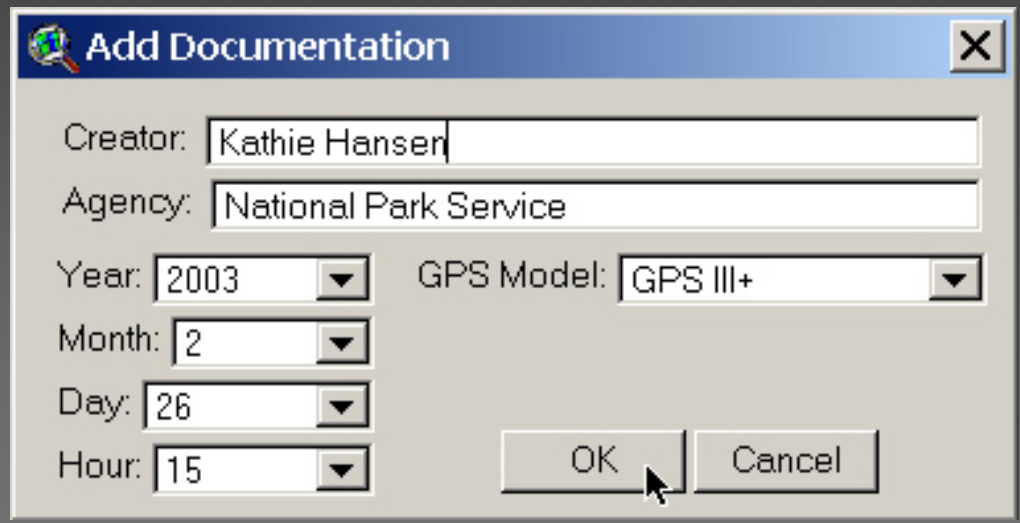
DNR Garmin: Shapefile Documentation

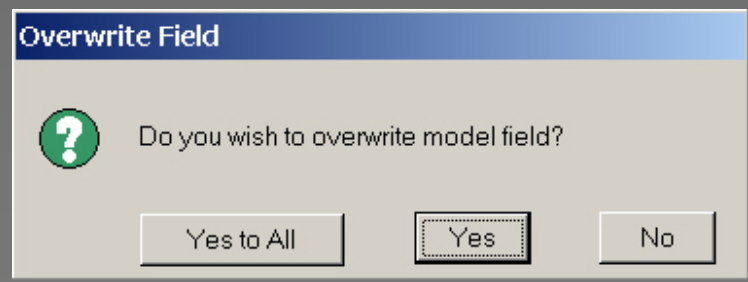
- Make Theme Active



- DNR Garmin | Add Documentation
  - Creator
  - Agency
  - Year
  - Day
  - Month
  - Hour
  - GPS Model
  - Overwrite Field Option

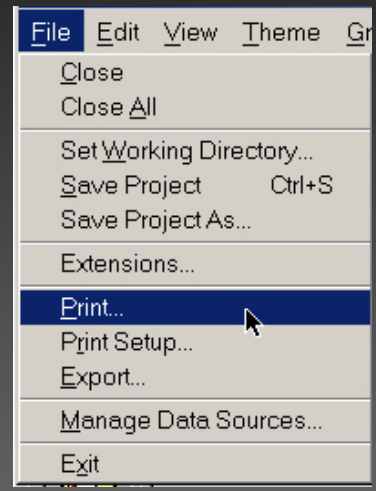


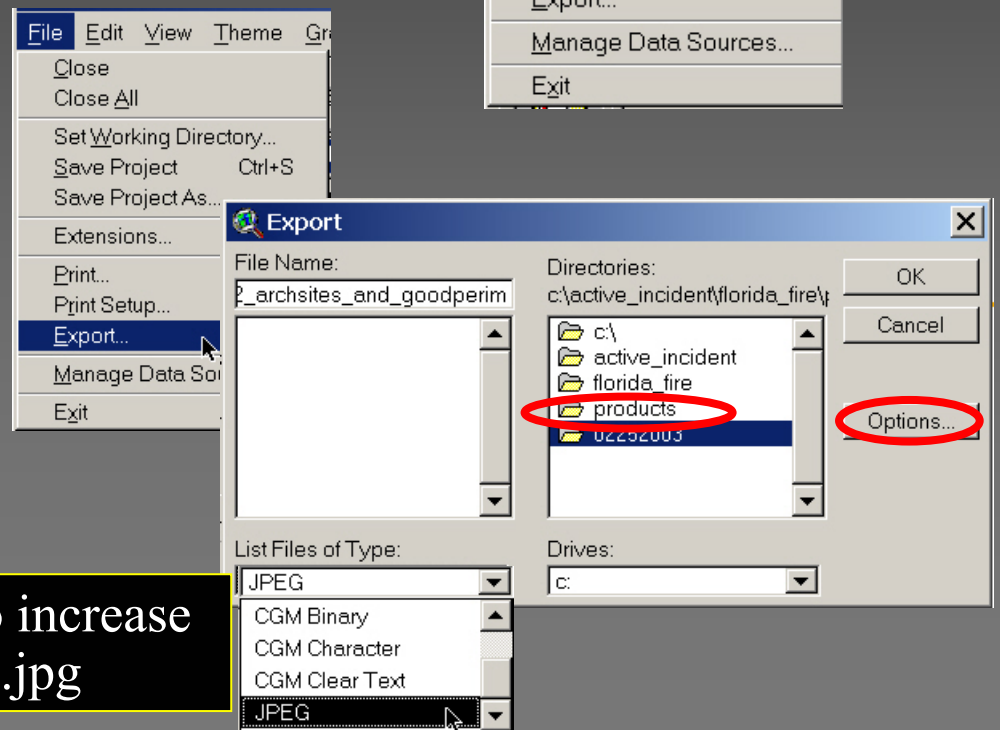




What if I Want a *Quick* Map?

- File | Print to print the View
  - Screen capture, nothing fancy
  - No legend, scale bar, etc.
- File | Export to save as a .jpg
  - Products folder by date
  - Change file type to .jpg
  - Name file
  - OK

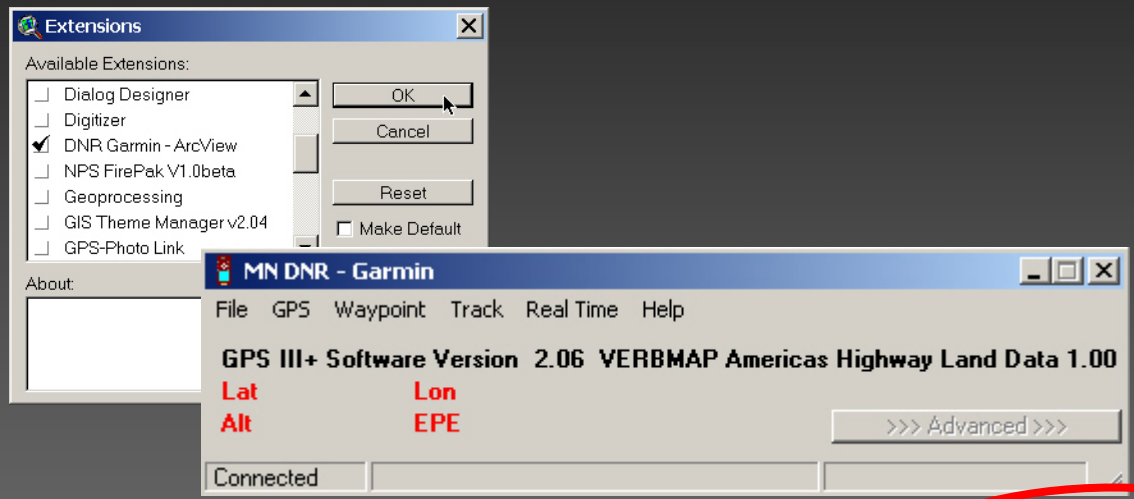




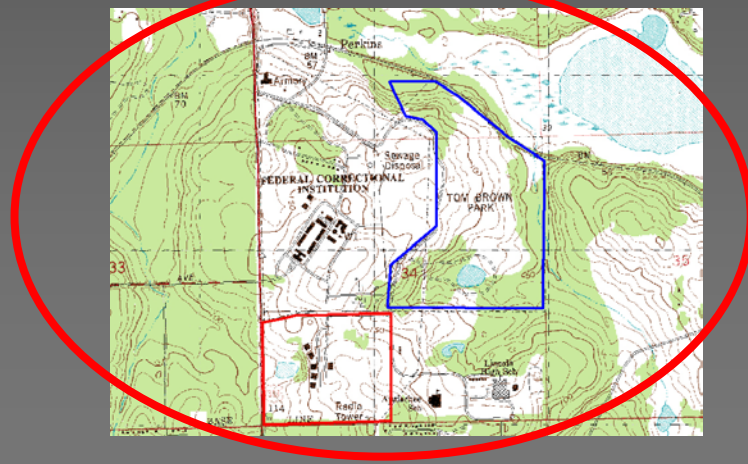
TIP: Click on **Options** to increase resolution and quality of .jpg

ArcView: AlaskaPak Extension

Collect Data



DNR Garmin



ArcView

AlaskaPak Extension

AlaskaPak is a NPS - AKRO developed extension for use with ArcView 3.x.

- Provides a suite of general utilities for use in a variety of GIS projects.
- Utilities are particularly useful for natural resource and cultural resource needs.
- Free to download, and all code is available within the extension for public use or modification.

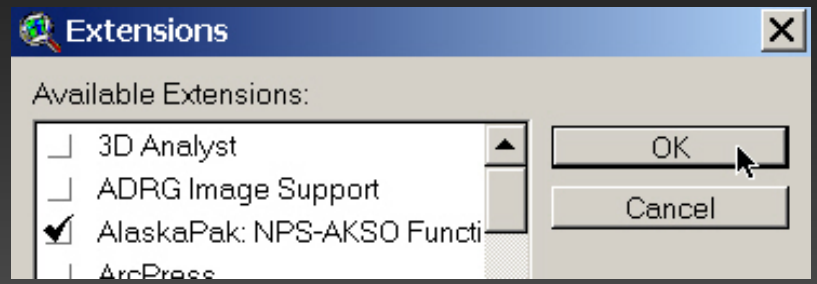
AlaskaPak Installation

- Installation
  - Navigate to \Software\AlaskaPak. Find on Training CD or internet*
  - Copy **aksopack.avx** to **C:\ESRI\AV_GIS30\ARCVIEW\EXT32**
  - Copy **aksopack.hlp** to **C:\ESRI\AV_GIS30\ARCVIEW\HELP**

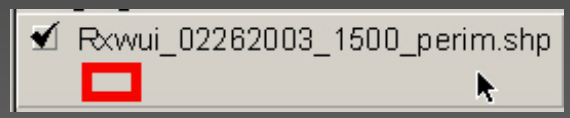
*http://www.nps.gov/gis/applications/new_apps.html

AlaskaPak Extension: Quick Acres

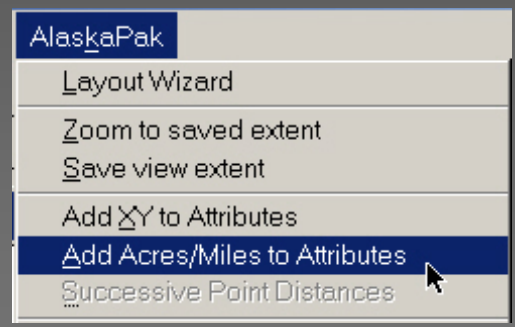
- Turn on AlaskaPak
  - File | Extensions | AlaskaPak



- Polygon Theme Active



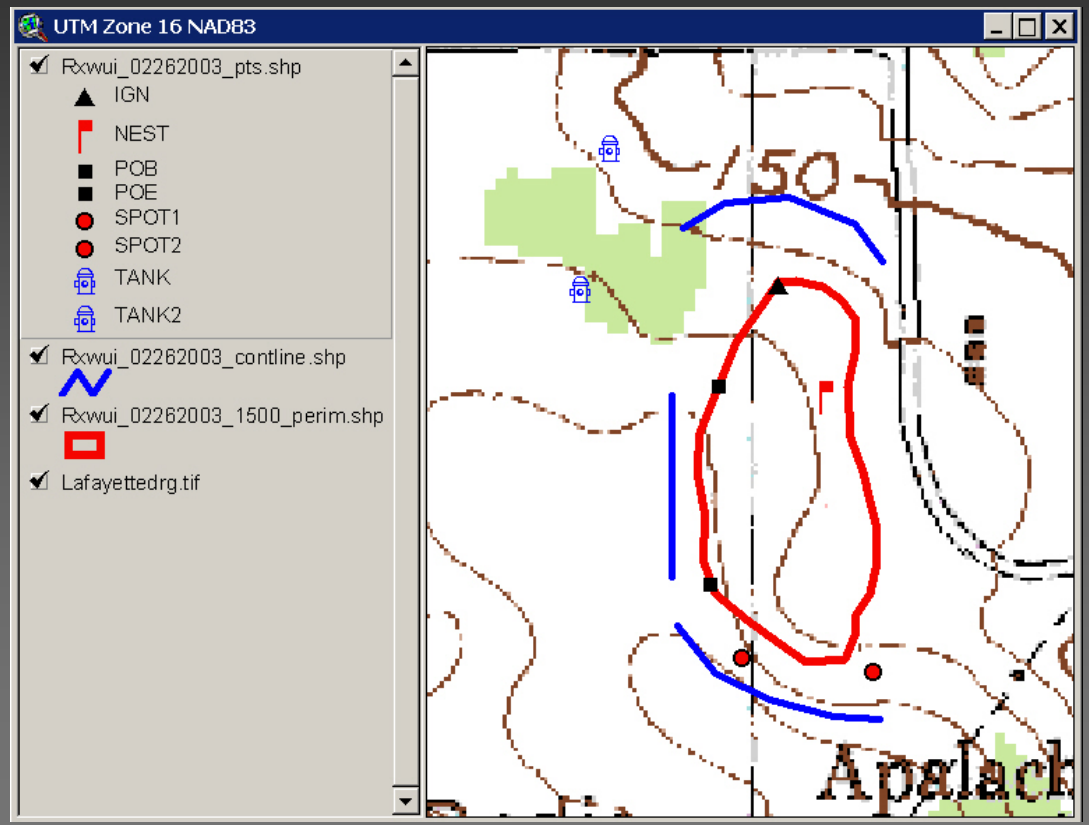
- Add Acres/Miles to Attributes



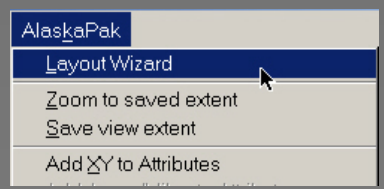
- Identify Button 
  - How many acres and perimeter miles was the burn?

AlaskaPak Extension: Quick Map

- Choose View Extent
  - Zoom in 
  - Zoom out 
  - Pan 

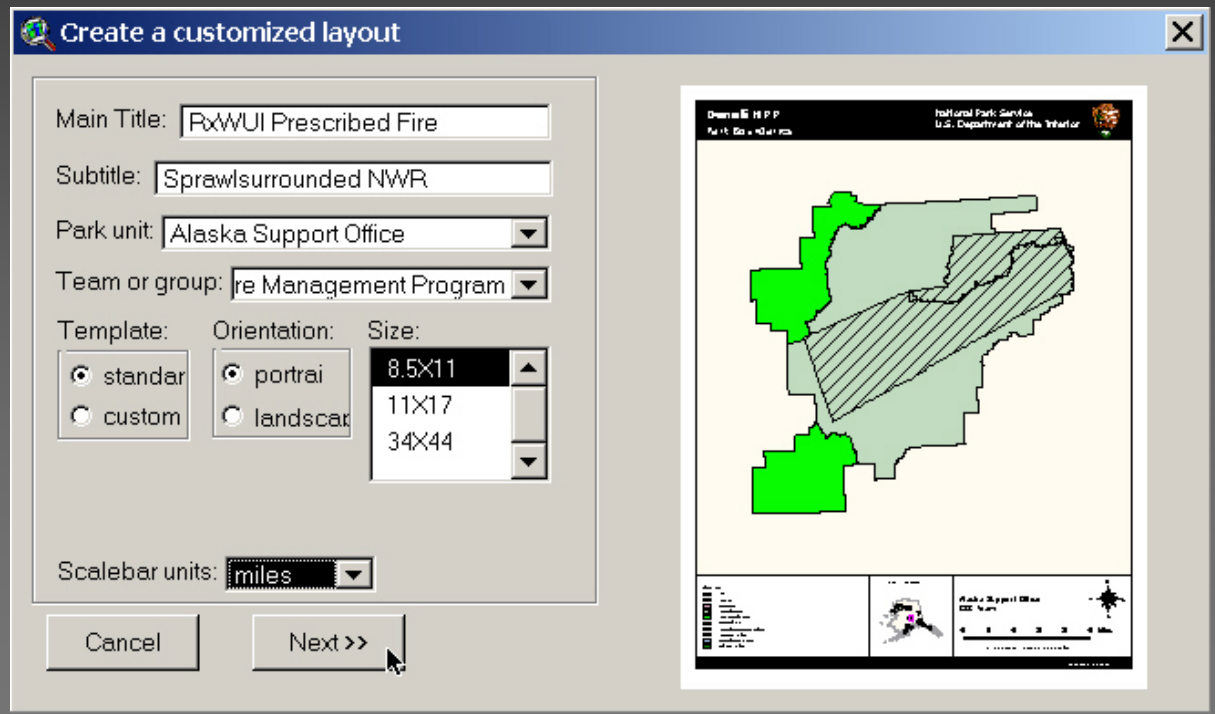


- AlaskaPak | Layout Wizard



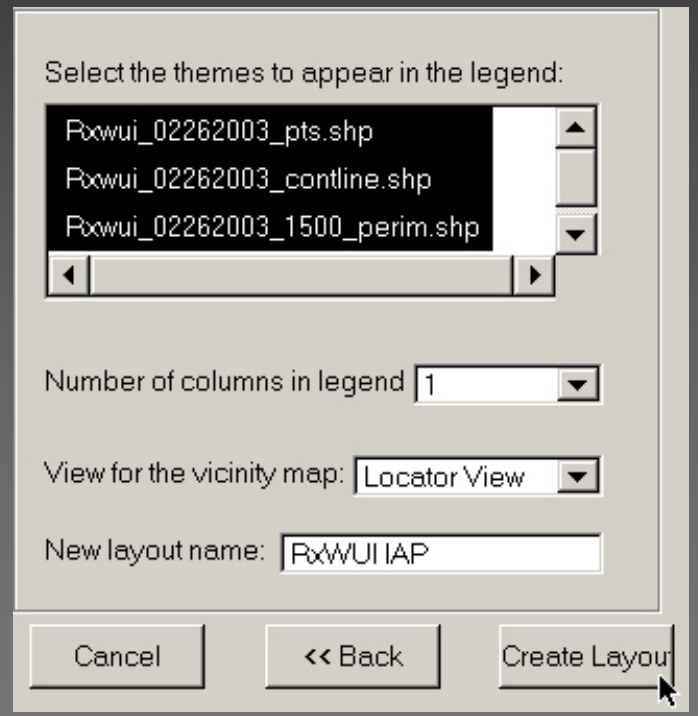
AlaskaPak Extension: Quick Map

- Create a Customized Layout
  - Main Title
  - Subtitle
  - Park Unit
  - Team or Group
  - Template
  - Orientation
  - Size
  - Scalebar units

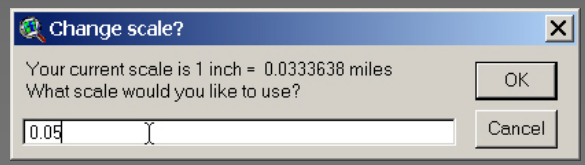


AlaskaPak Extension: Quick Map

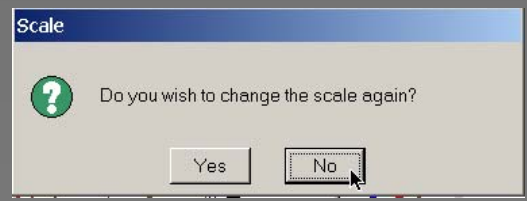
- Create a Customized Layout
  - Select Themes - use shift key for multiple selection
  - Number of columns in legend
  - View for the vicinity map
  - New layout name
  - Create Layout



- Change Scale?



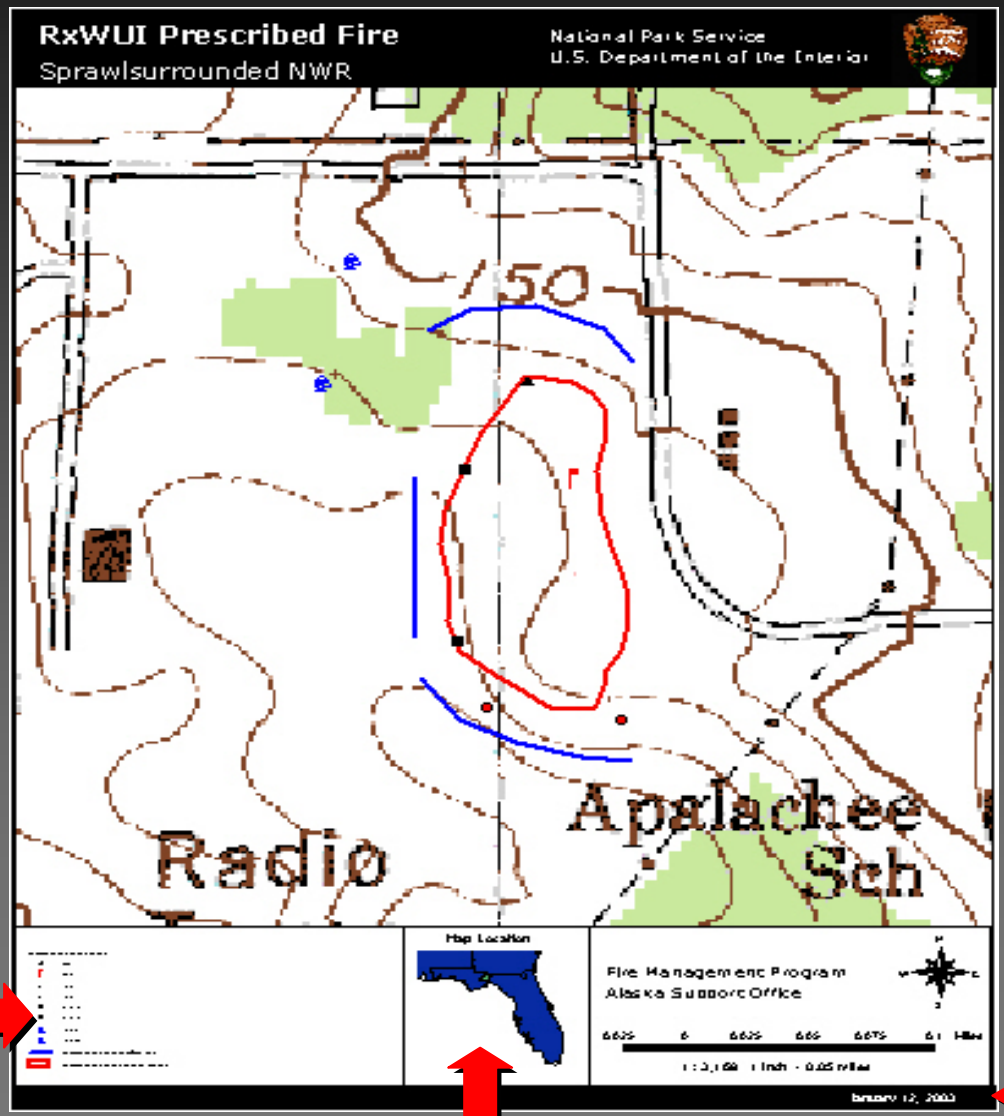
  - allows for more logical ratio
  - repeat until desired outcome



AlaskaPak Extension: Quick Map

- File | Print
- File | Export…*

*Save .jpgs in products folder by date!

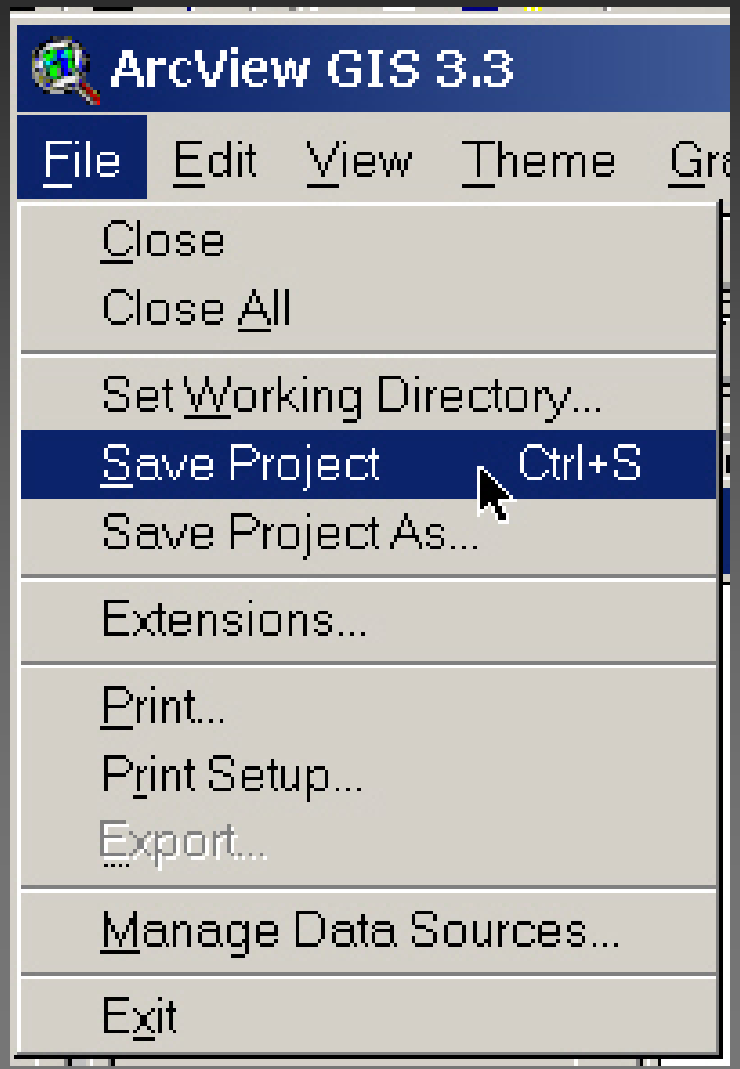


Save ArcView Project

- File | Save Project

  OR…

- Hit that SAVE button!



Summary

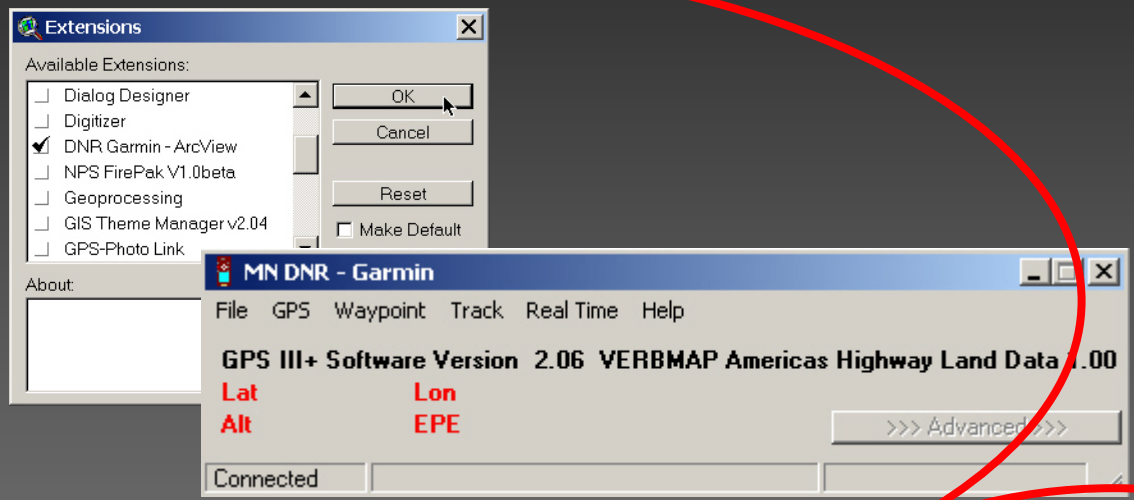
- Edit the View legend for point and polygon themes
- Calculate attributes for shapefile with DNR Garmin
- Document shapefiles with DNR Garmin
- Print or save a “map”
- Install AlaskaPak Extension
- Turn on AlaskaPak in ArcView
- Calculate Polygon Acreage and Perimeter Miles
- Create a Layout with the AlaskaPak Layout Wizard

END OF POST-FIELD FOR RESTORATION FIRE

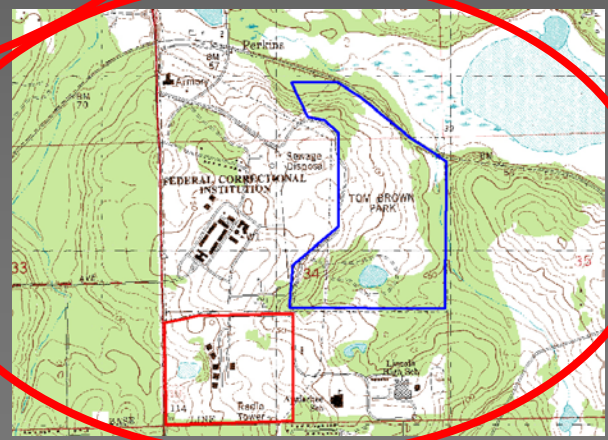
- Close ArcView Project

DNR Garmin & ArcView: Downloading Waypoints & Tracks, Managing Tracks and Editing Legend

Collect Data



DNR Garmin



ArcView

Objectives

- Download Waypoints and save as Point Shapefile
- Track Management for multiple track segments
  - Download track
  - Save as Point Shapefile
  - Save as again as Line Shapefile
  - Select points that make up “polygon”
  - convert points to polygon
  - Delete unwanted lines
- Edited legend symbology, labels and theme names

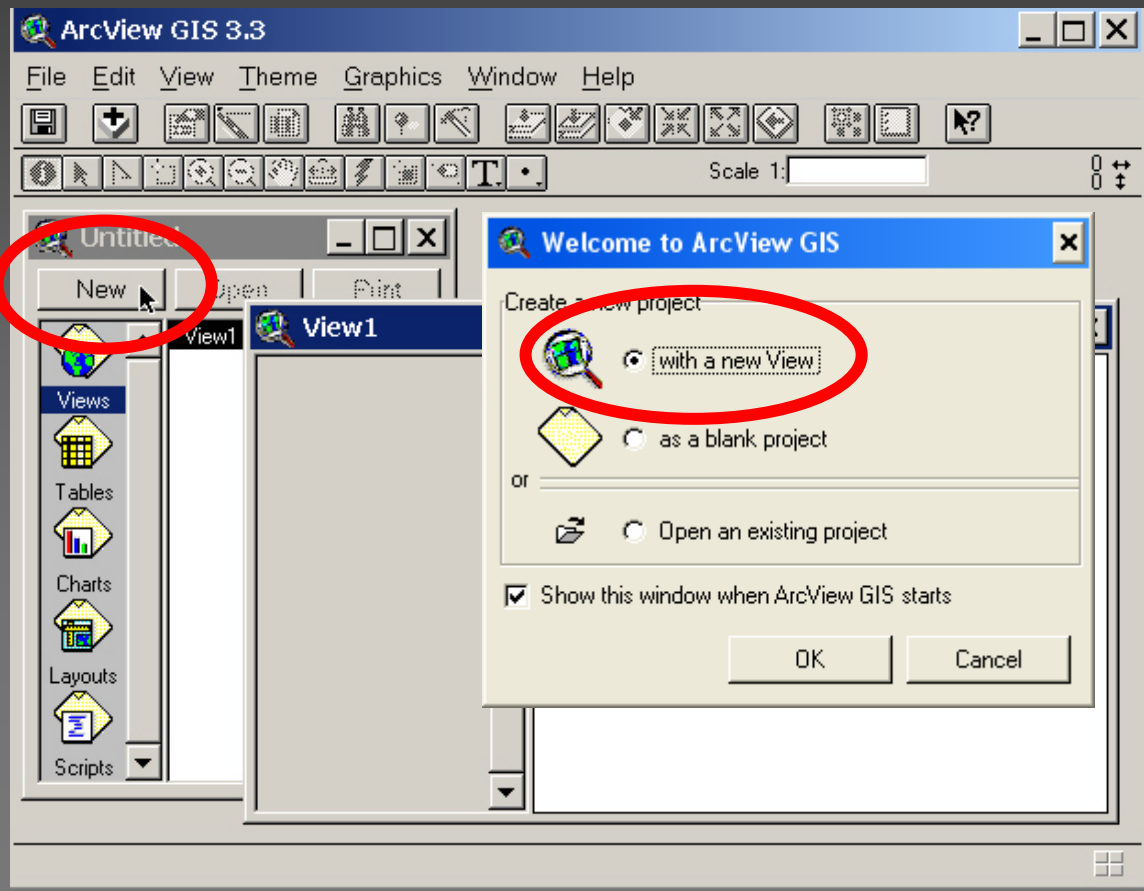
New ArcView Project

- Start ArcView
  - Start Button| Programs | ESRI | ArcView3 | ArcView

- Open an ArcView
  - New View

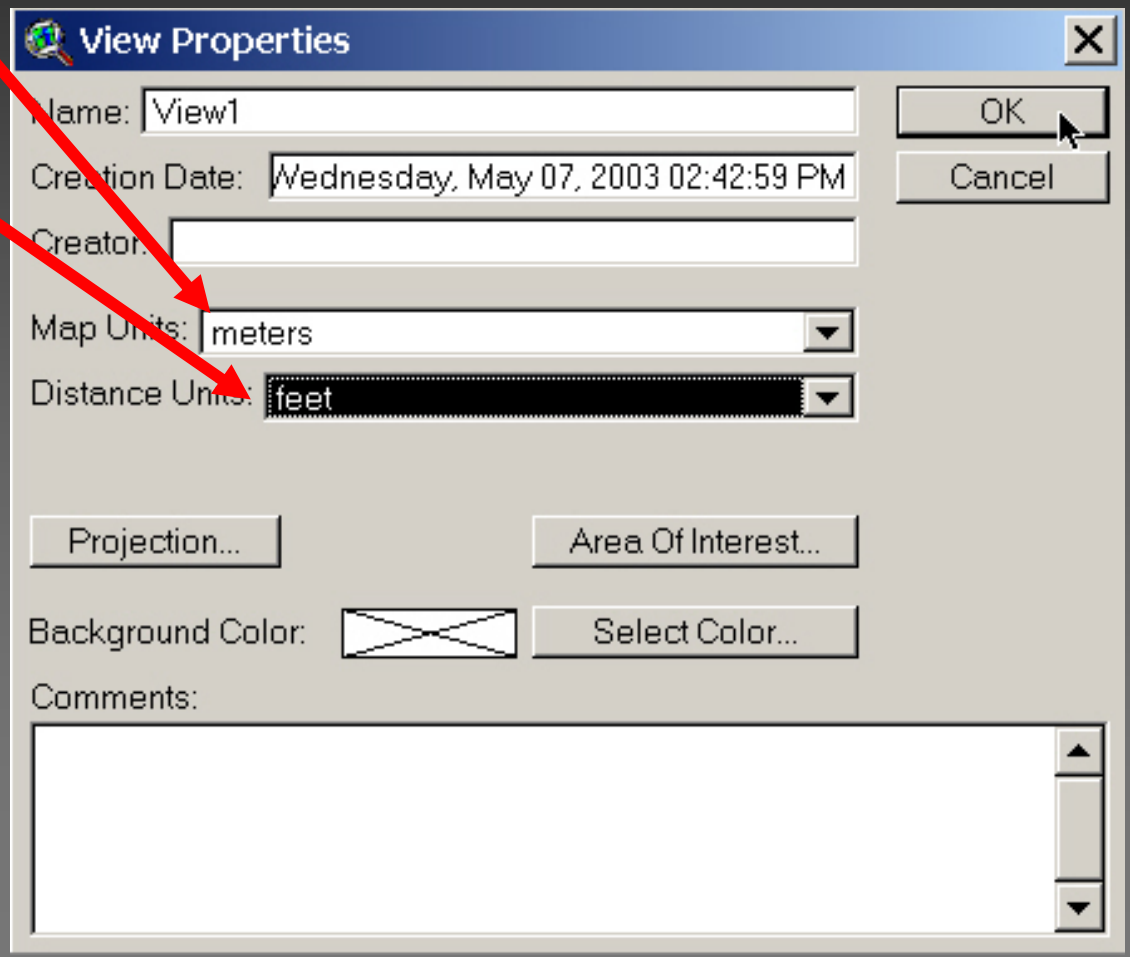
  Or…

  - "with a new View" when dialog box inquires



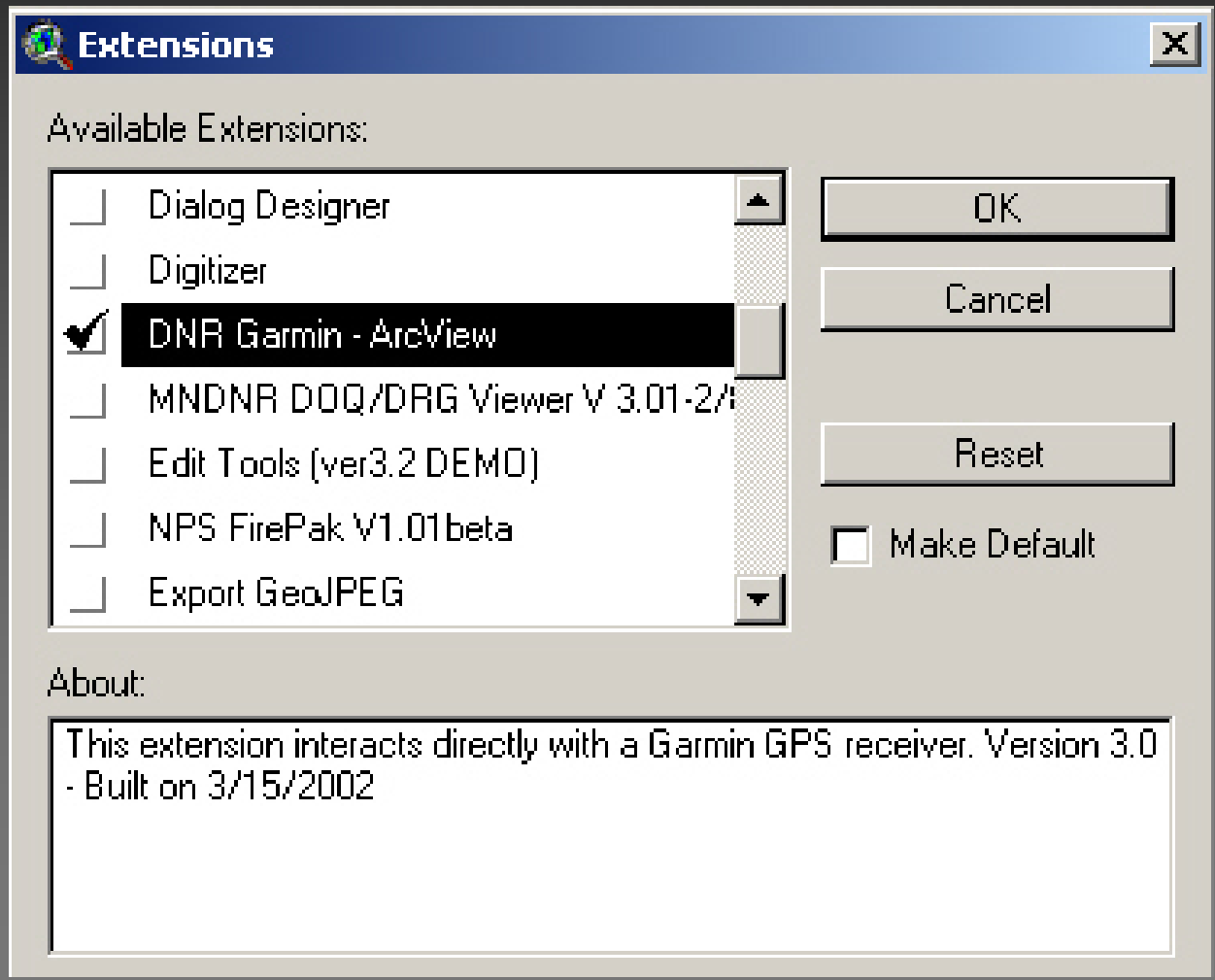
New ArcView Project

- Set View | Properties
  - Map Units: meters
  - Distance Units: feet



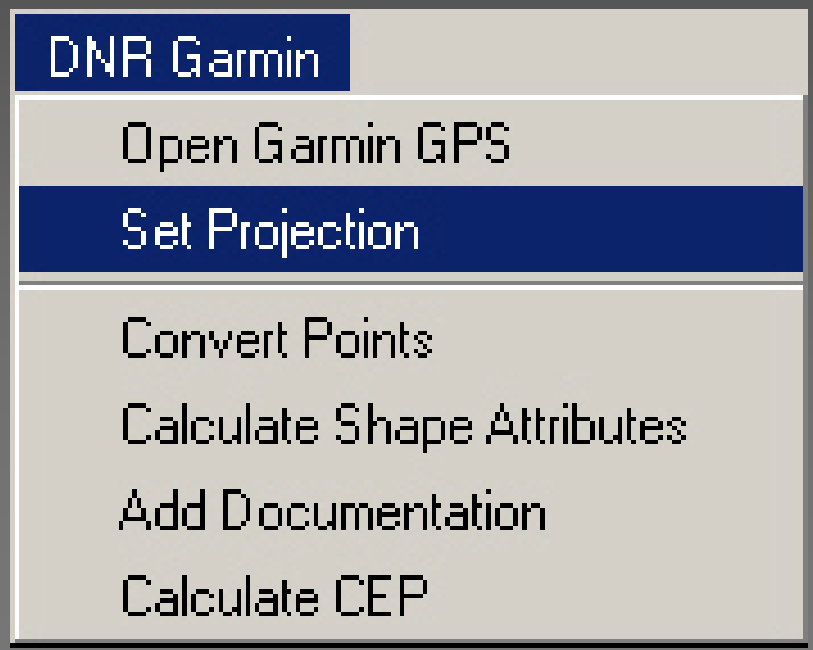
New ArcView Project

- Load Extensions
  - **AlaskaPak**
  - **DNR Garmin**
  - **MrSID**



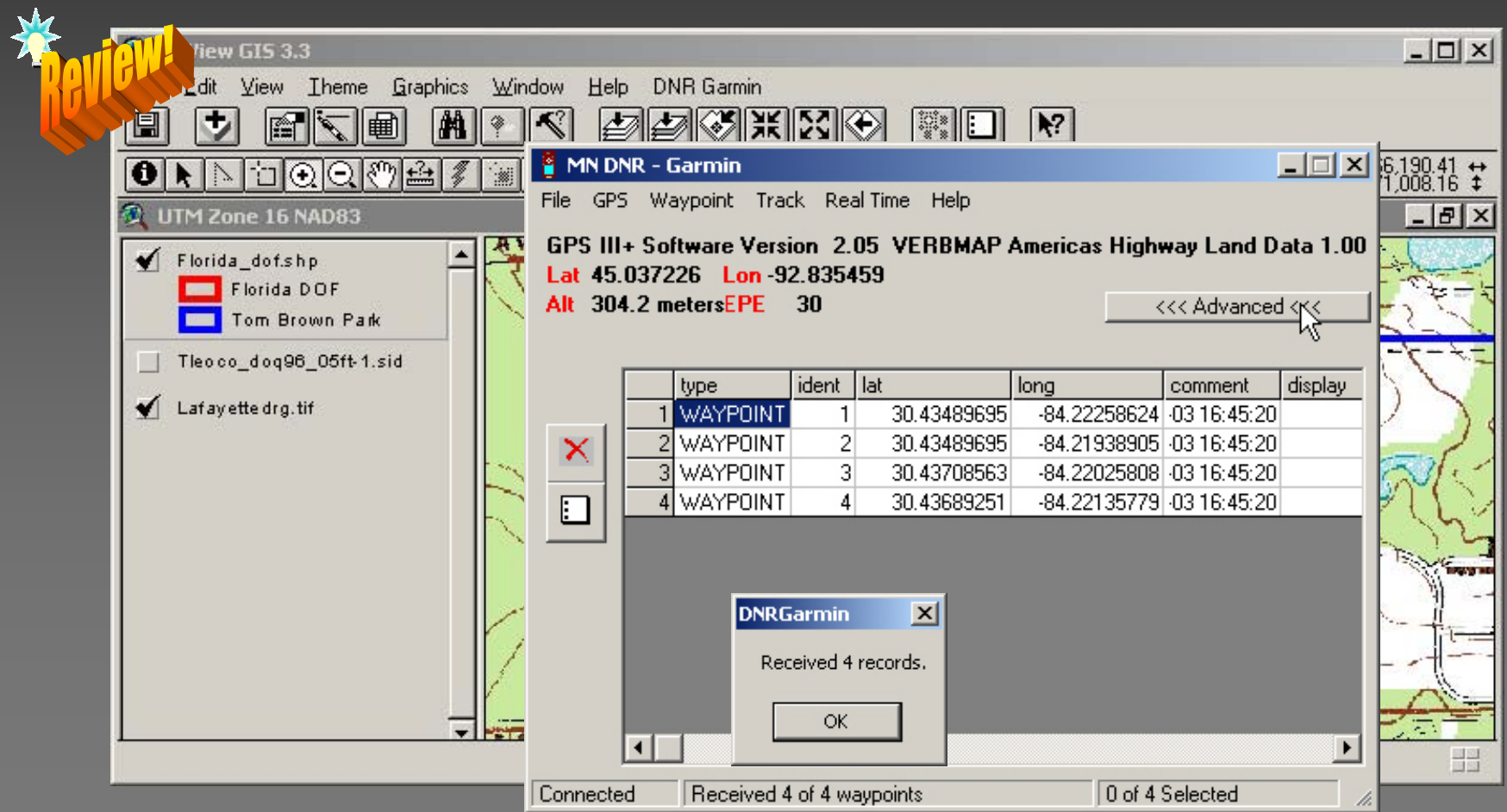
New ArcView Project

- Set Projection
  - Since some of you may already have loaded DNR Garmin, we need to ensure the Projection is set
  - Select DNR Garmin | Set Projection



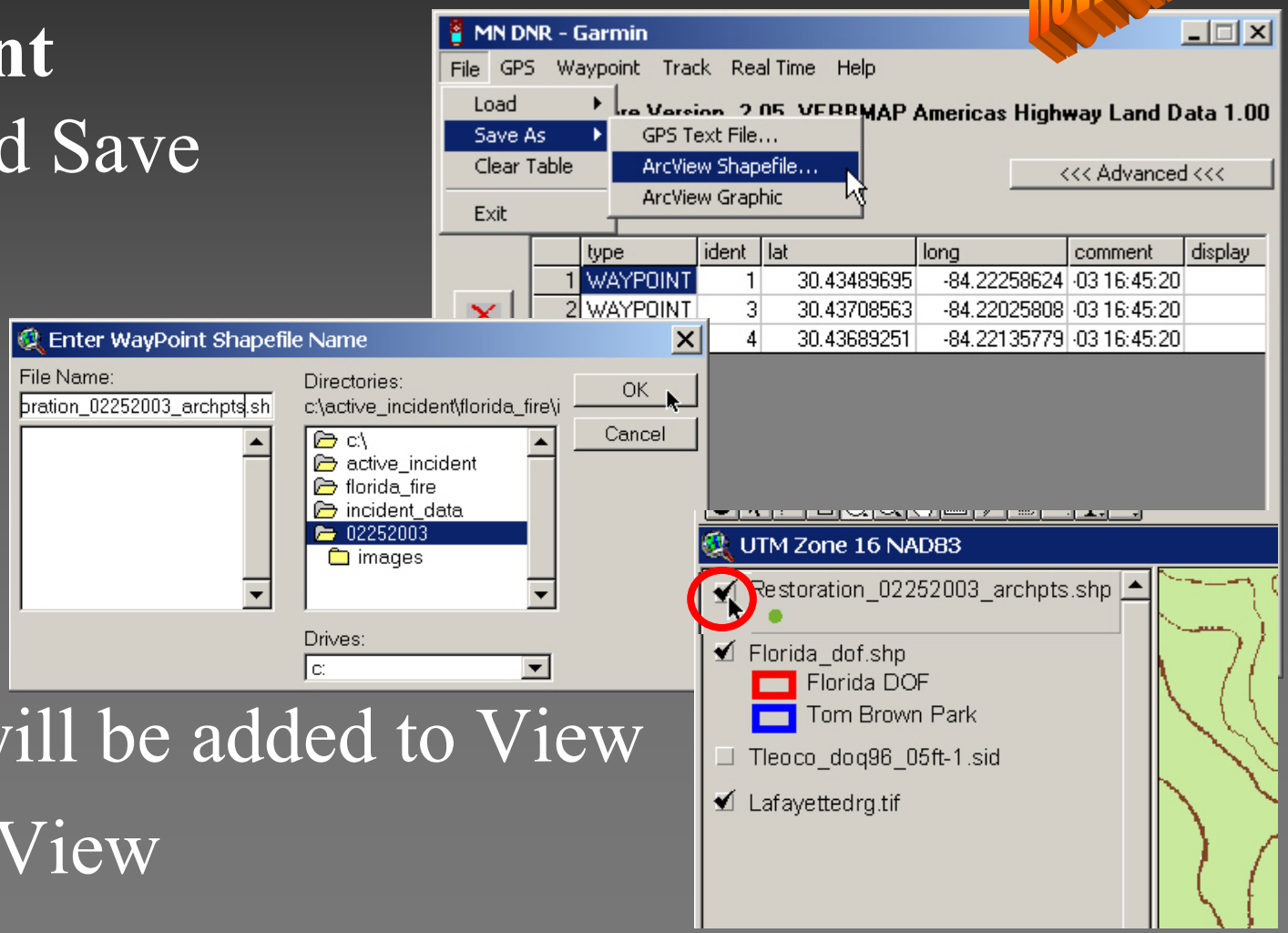
Download Waypoints into ArcView

- Select Waypoint | Download
- Click <<<Advanced<<< button to see entire table



Save as ArcView Shapefile

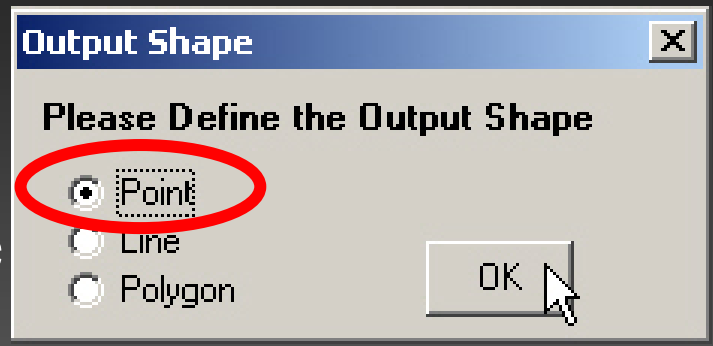
- Select File | Save As | ArcView Shapefile
- Output **Point**
- Rename and Save Shapefile

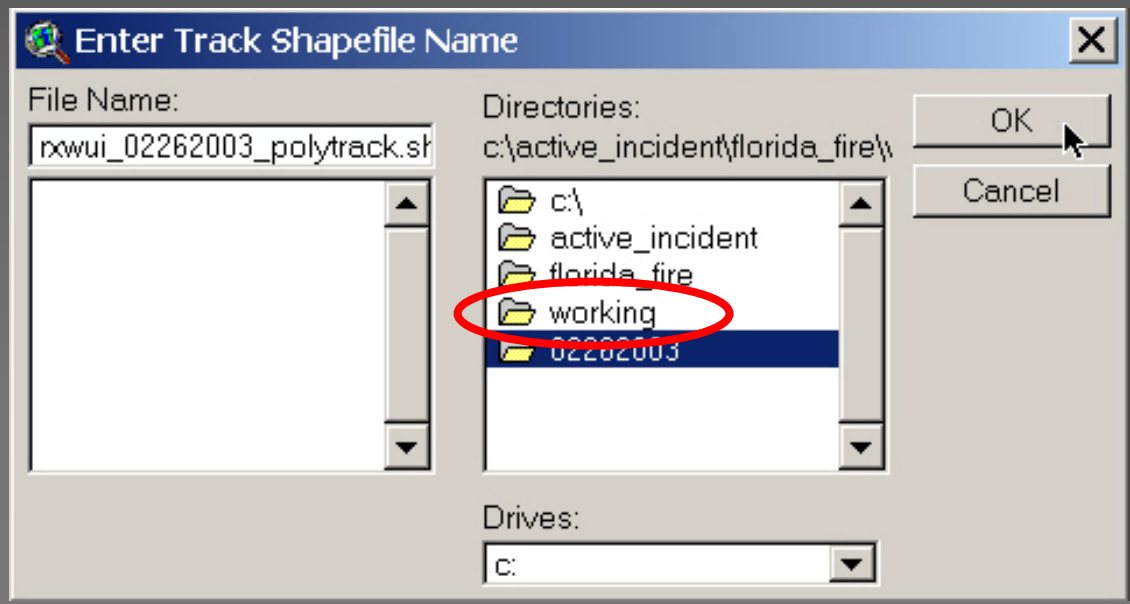


- Shapefile will be added to View
- Turn on in View

Track Management

- DNR Garmin Extension
  - Track | Download
  - File | Save As | ArcView Shapefile
  - Output **Point**
  - Save in **Working** Folder





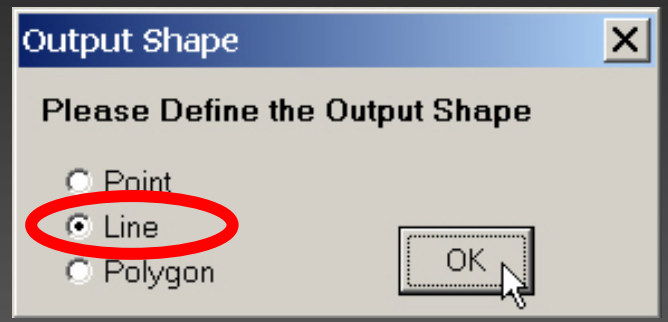
Track Management

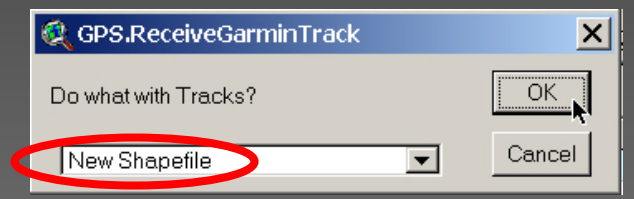
- DNR Garmin Extension
  - Track | Download
  - File | Save As | ArcView Shapefile
  - Output **Line**
  - New Shapefile
  - Working Folder OR...
  - **INCIDENTDATA**

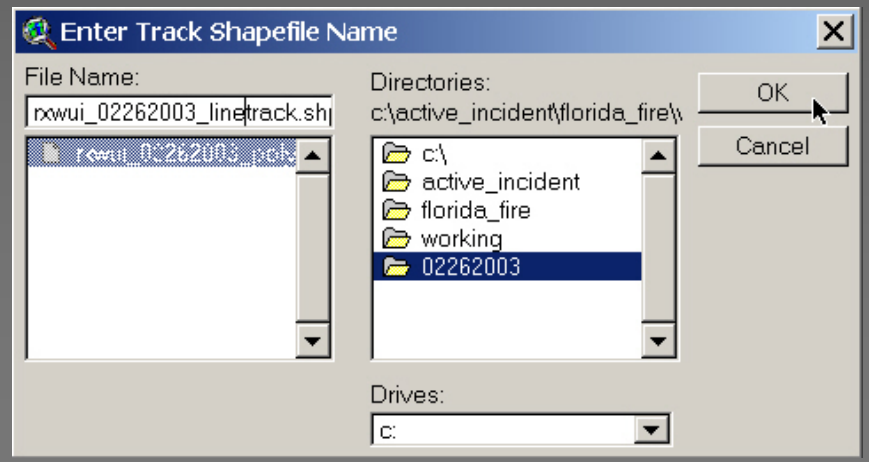
  folder and name

  as line feature

  (e.g., cigtoss_05162003_hndln.shp)





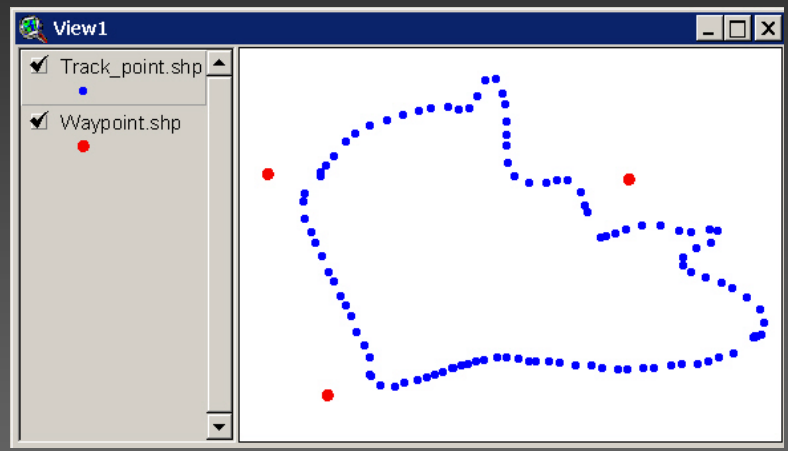


Track Management

- Exit the DNR Garmin Extension
  - File | Exit

Edit Point Shapefile

- Turn on Track **Point** Shapefile (turn off others)
  - Make Point Theme Active (raised)

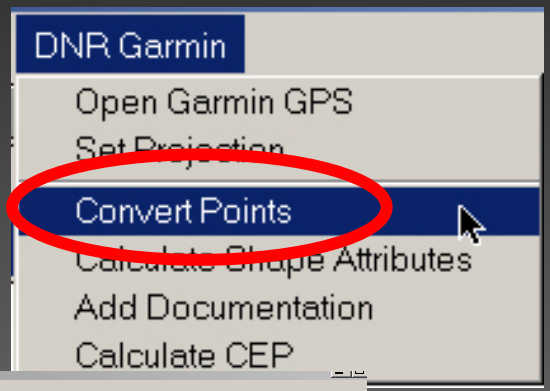


  - Use **Select tool** and select points that make up the "polygon"

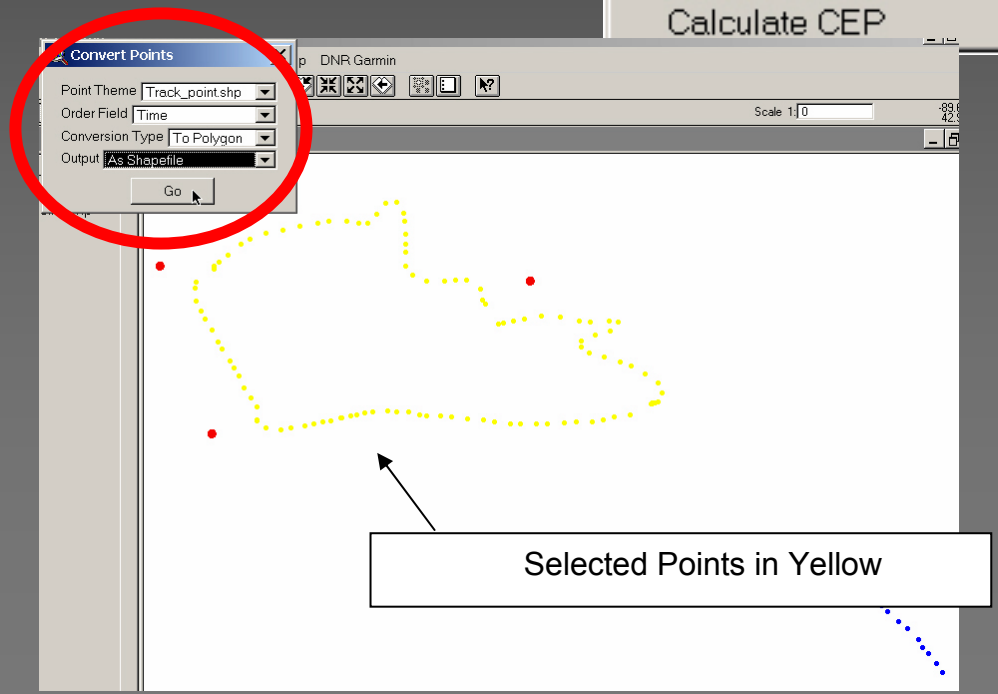
Edit Point Shapefile

- In the DNR Garmin drop down menu choose:

  DNR Garmin | Convert Points

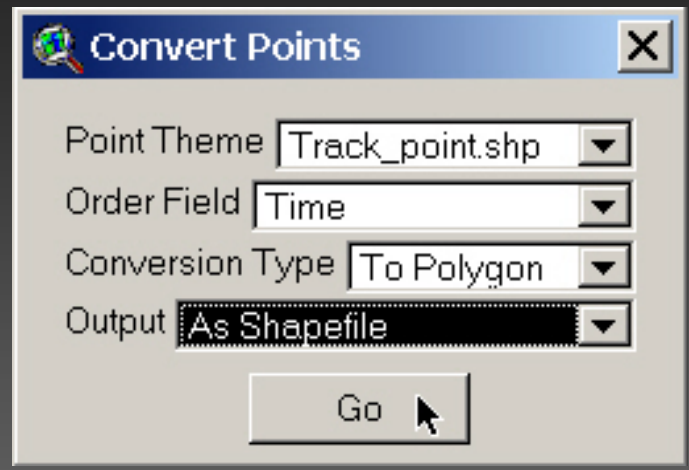


- Convert Points window pops open

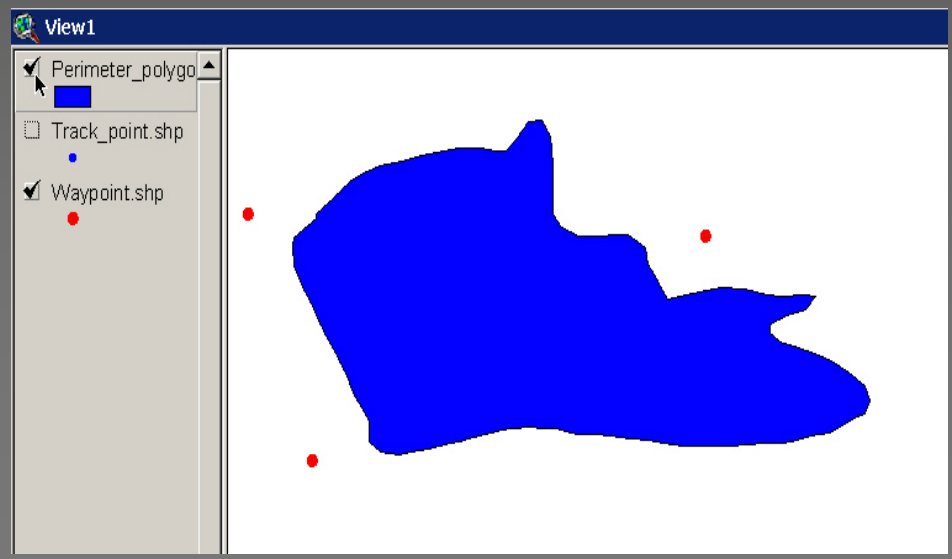


Edit Point Shapefile

- Order Field | **Time**
- Conversion Type | **To Polygon**
- Output | **As Shapefile**



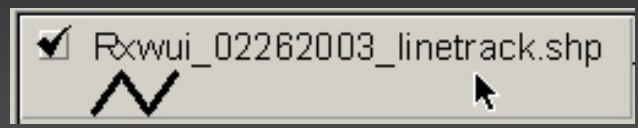
Result: Polygon created from selected points



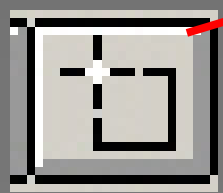
TIP - AlaskaPak also has this menu option!

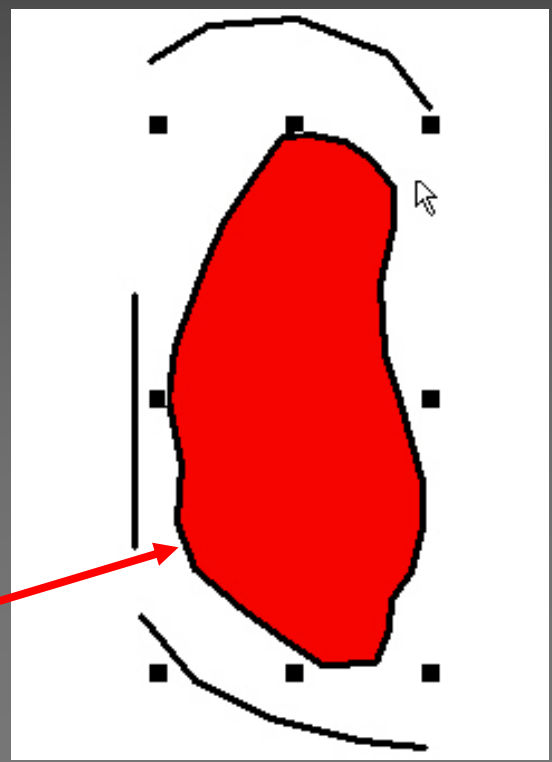
Edit Line Shapefile

- Turn on Track **Line** Shapefile (turn off others)
- Line Theme Active
- Theme | Start Editing



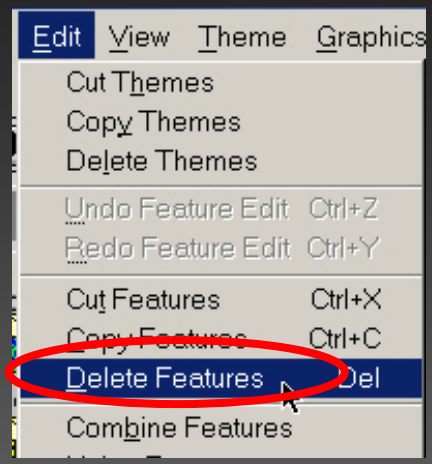
- Select unwanted lines (i.e. those that make up the polygon features)



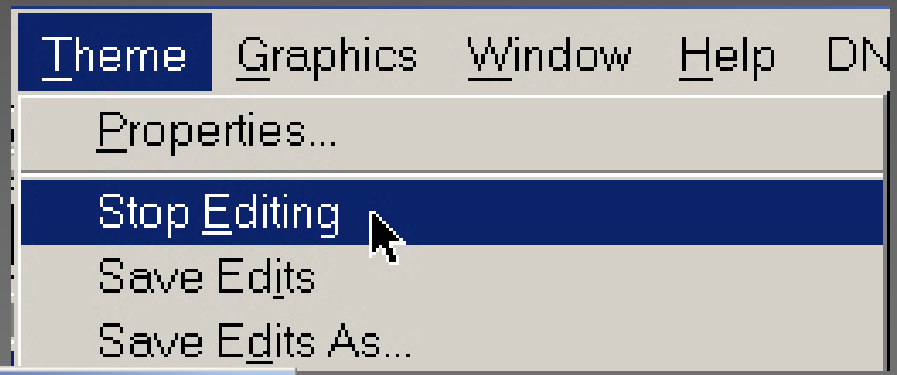


Edit Line Shapefile

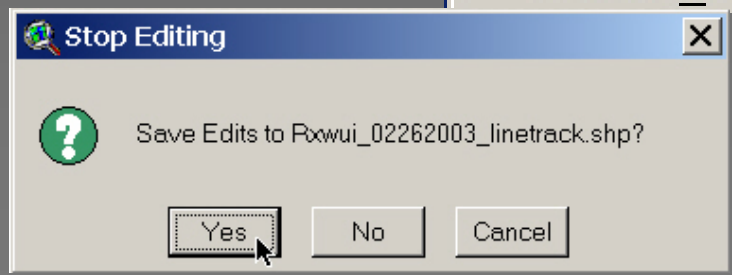
- Edit | Delete Features



- Theme | Stop Editing

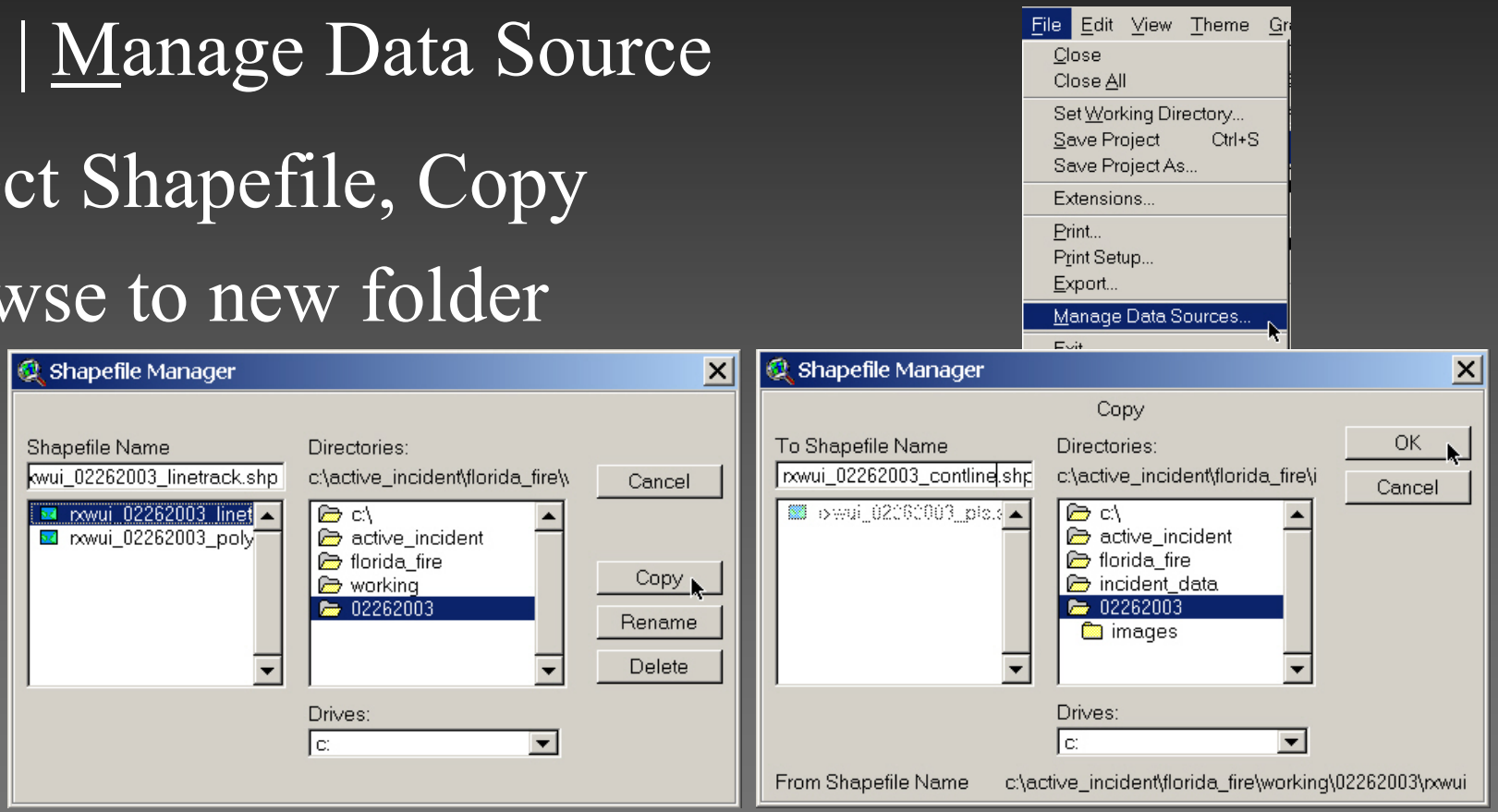


- Yes, Save Edits



FYI - Copying Shapefiles

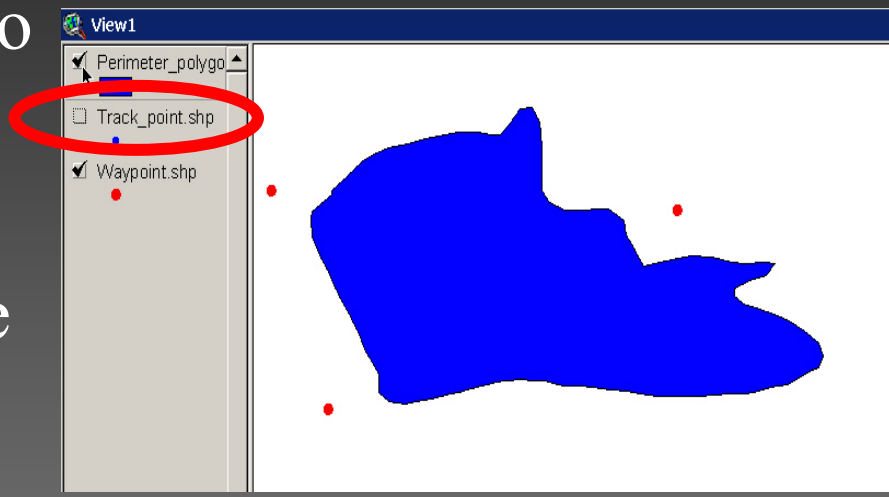
- File | Manage Data Source
- Select Shapefile, Copy
- Browse to new folder
- OK

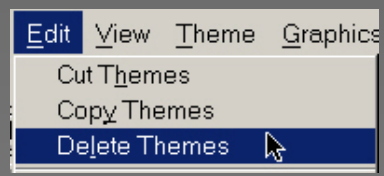


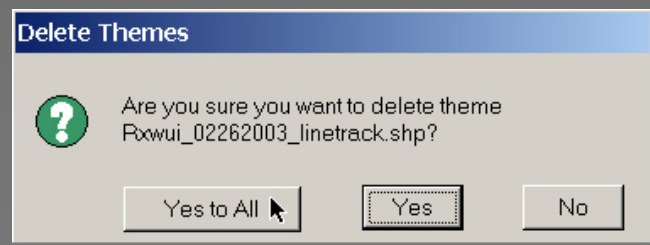
- Repeat to copy additional files
- Close Shapefile Manager

Deleting a Theme in the View

- Delete **Track Point** Theme from View
  - Select theme (make active) to delete
  - Hold shift key to select more than one theme (for future reference)
  - Edit | Delete Themes
  - Yes or Yes to All

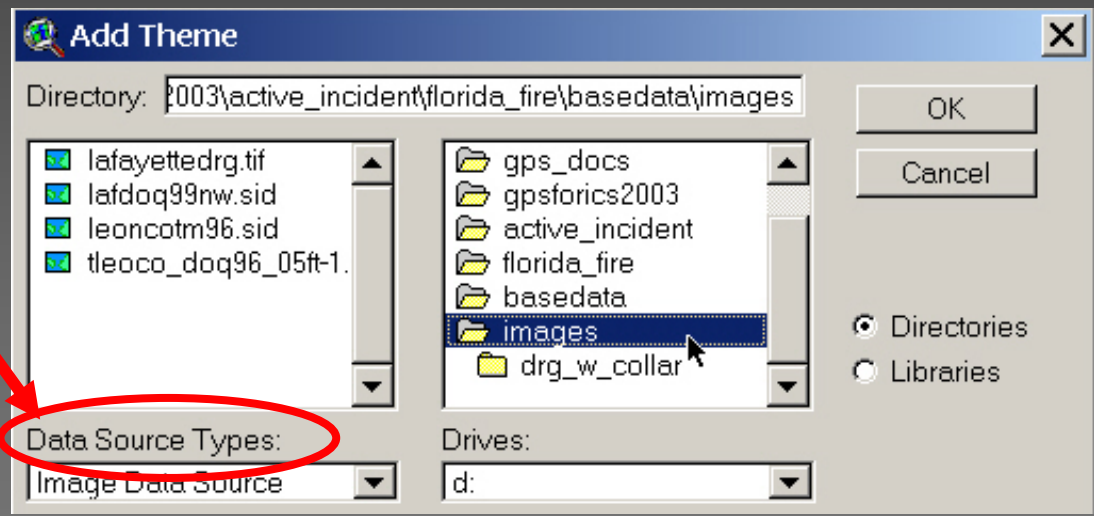






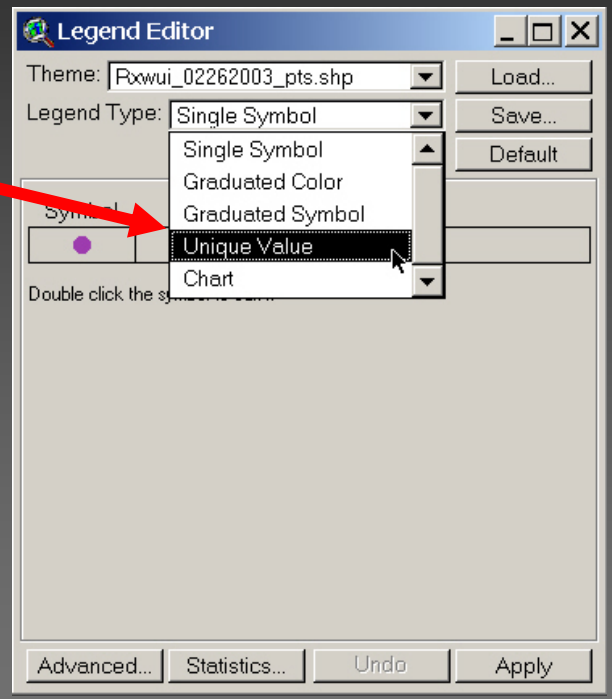
Add Themes to the View

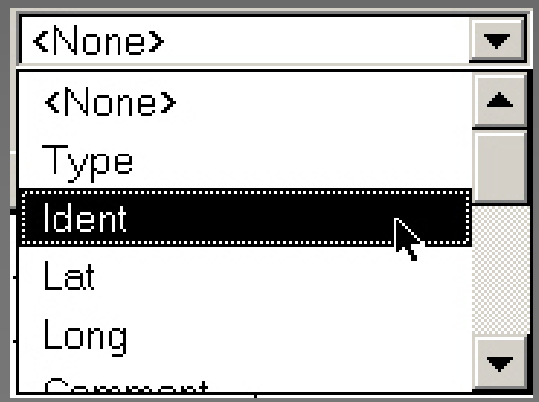
- Add Theme Button  or View | Add Theme
- Change Data Source Type to Feature or Image Data Source
- Select more than one file by holding the shift key down



Edit Theme Legend

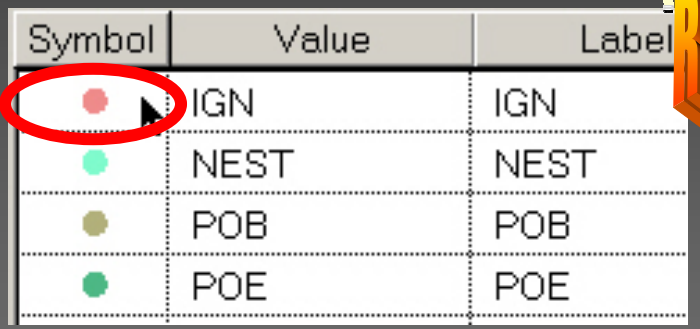
- Double click on **Point** theme
- Legend Type: **Unique Value**
- Values Field:
  - select a field with a **unique** attribute
  - e.g., **ident**

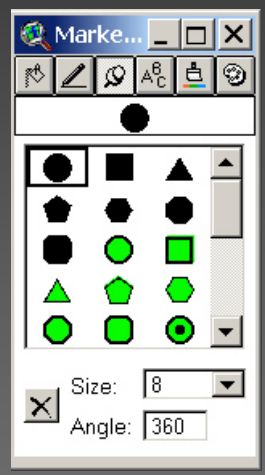




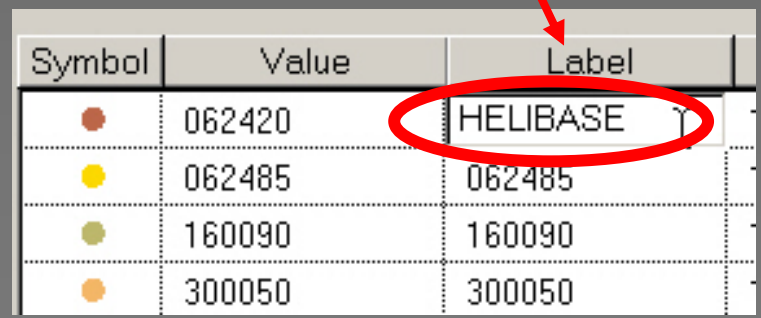
Edit Theme Legend

- Edit size, symbol, and color for each unique point
  - double-click on symbol to open symbol window
  - change symbols





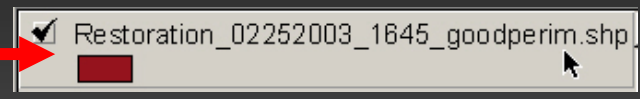
  - double-click on cell in label field to change label



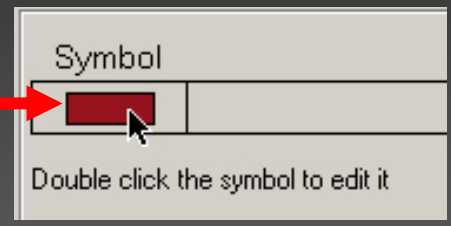
- Click Apply !
- Save Project!

Review! Edit Theme Legend

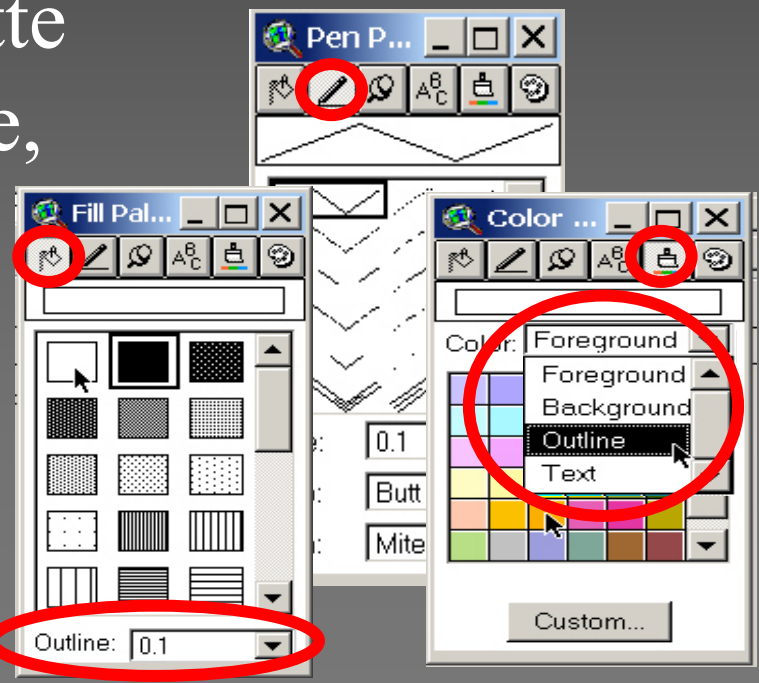
- Edit legend for line and polygon shapefiles
- Double click on theme in legend



- Double click on symbol to Edit

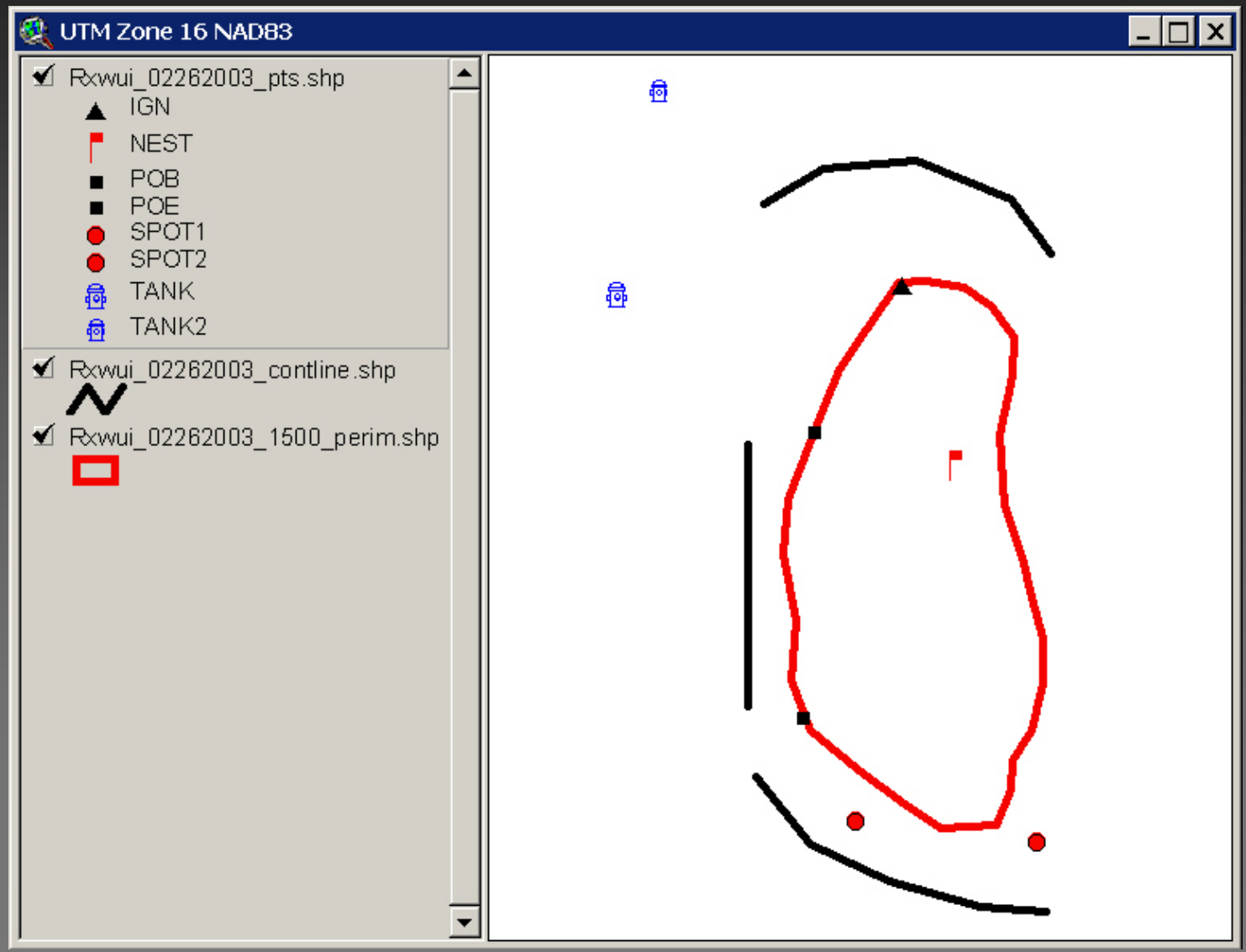


- Use the fill palette, color palette and pen palette to change style, fill, line/outline weight, and give color to foreground, background, and outline



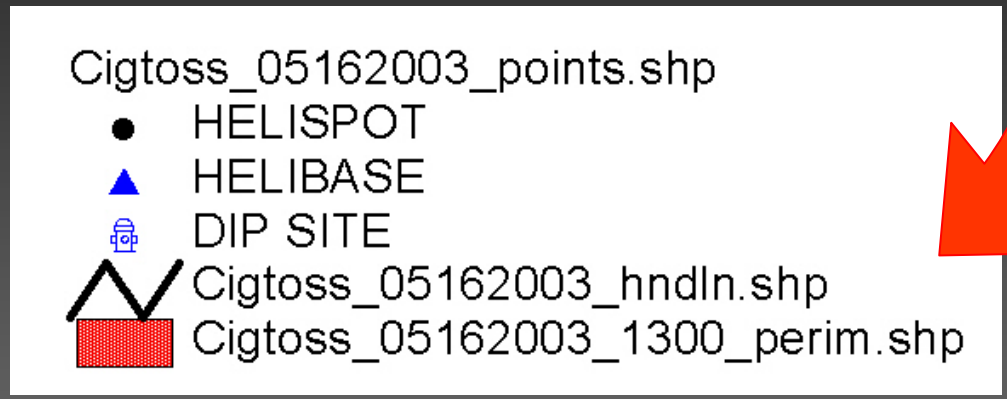
- Apply

Example of View with Edited Legend

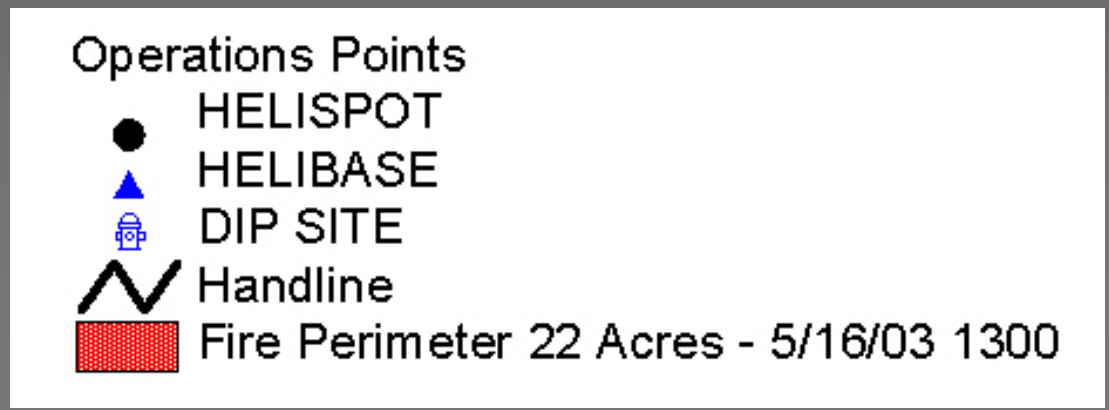


Advanced Legend Operations

- The map legend will look like this…
  - symbols look good
  - names are cryptic!



- You would like your map legend to look like this!



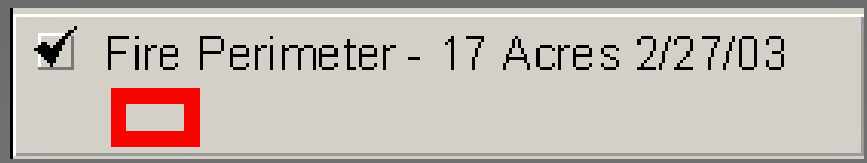
Advanced Legend Operations

- Make the theme active

- Theme | Properties

- Change Theme Name

- OK



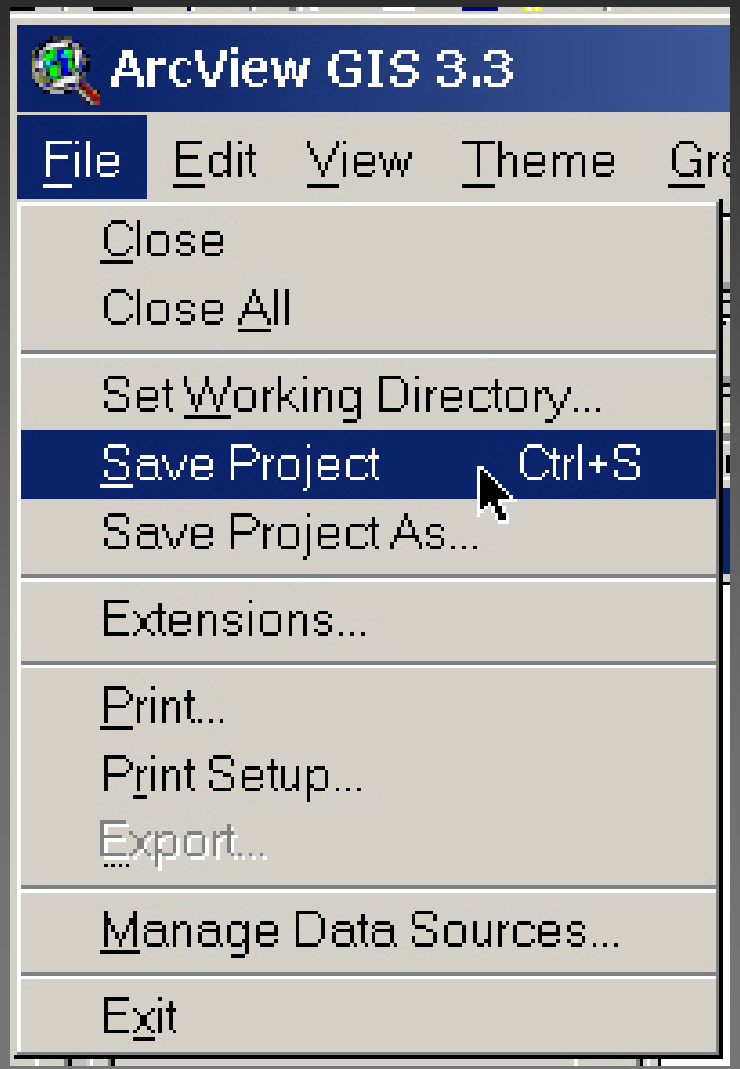
- Repeat for all other themes

Save ArcView Project

- File | Save Project

  OR…

- Hit that SAVE button!

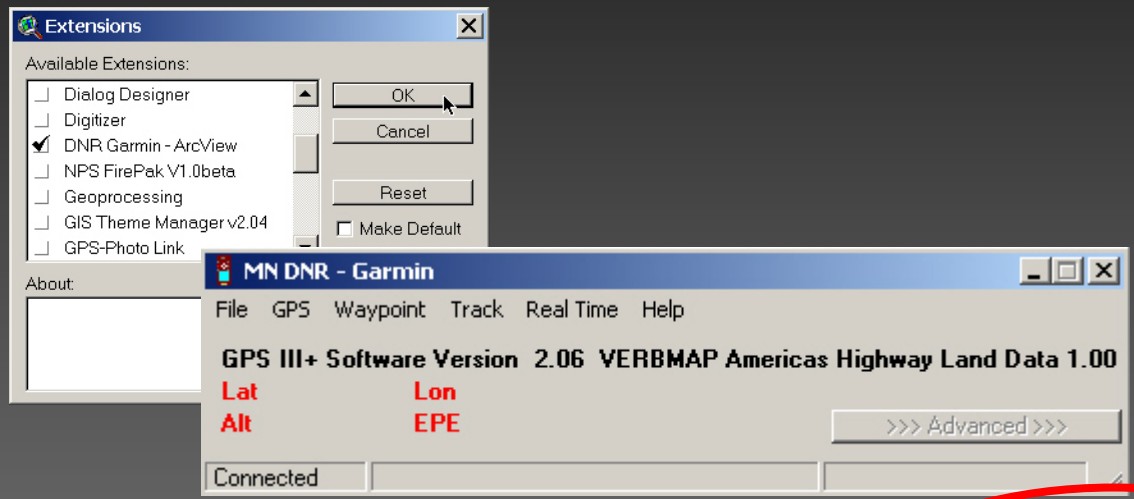


Summary

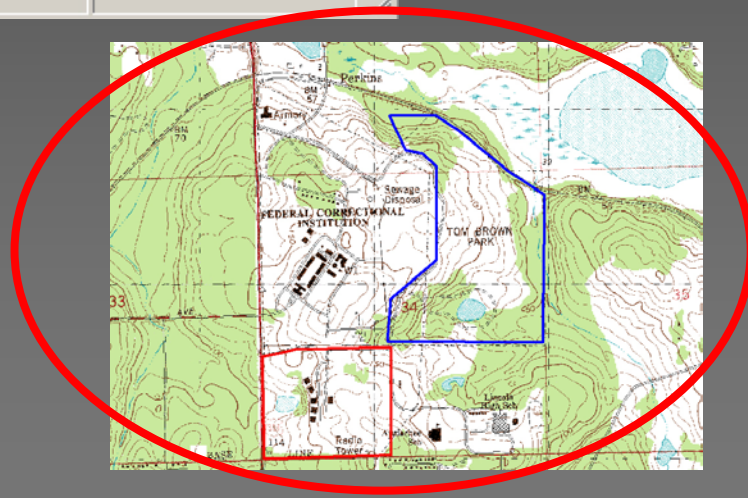
- Track Management
  - Downloaded track with polygon and line features
  - Saved as Polygon Shapefile
  - Saved as Line Shapefile
  - Deleted unwanted polygons
  - Deleted unwanted lines
  - Copied final shapefiles to incident data folder
- Deleted/Added themes to View
- Edited legend symbology, labels and theme names

ArcView: FirePak Extension & Advanced Legend Edits, Continued

Collect Data



DNR Garmin



ArcView

Objectives

- Install and turn on FirePak Extension
- Attribute Fire Perimeter Polygon
- Perform Additional Advanced Legend Operations
  - Add new palette to the legend editor
  - Use forestry.avp to change symbology
  - Change theme name in legend
- Create a Layout with the AlaskaPak Layout Wizard or on your own

FirePak Extension

NPS Firepak 1.0 provides a set of tools useful for a variety of fire management applications.

- Allows users to convert a set of points to a polygon
- Calculate acreage and perimeter miles
- Add a set of key attributes to daily fire perimeter shapefiles and coverages
- The attributes added to fire perimeter polygons using the Fire Perimeter Attributes function conform to the proposed interagency data standard for daily fire perimeters

FirePak Installation

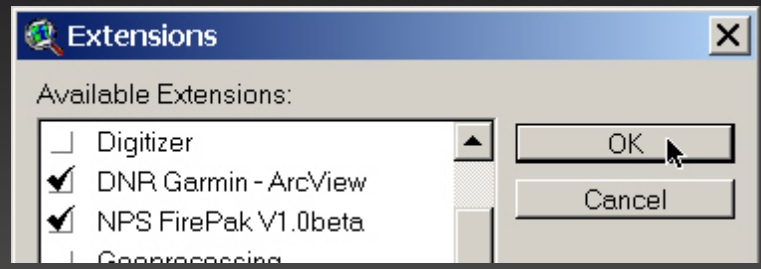
- Installation
  - Navigate to \Software\FirePak. Find on Training CD or internet*
  - Copy firepak.avx to C:\ESRI\AV_GIS30\ARCVIEW\EXT32
  - Optional: Open and read readme.txt for a quick overview of FirePak

* http://www.nps.gov/gis/applications/new_apps.html

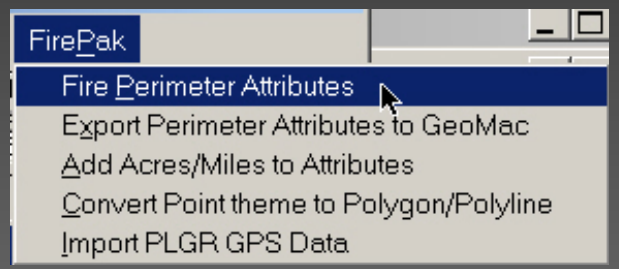
TIP ArcGIS 8.x version also available on CD and on the web

FirePak Extension: Attribution

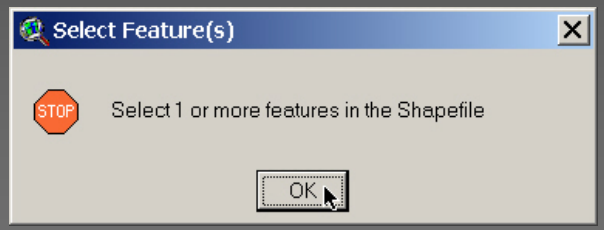
- Turn on FirePak
  - File | Extensions | NPS FirePak



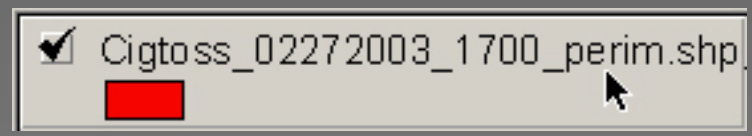
- FirePak | Fire Perimeter Attributes
- or… Fire Button



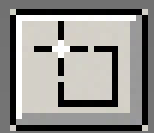
- STOP



Polygon must be selected



- Make sure theme is active
- Select polygon

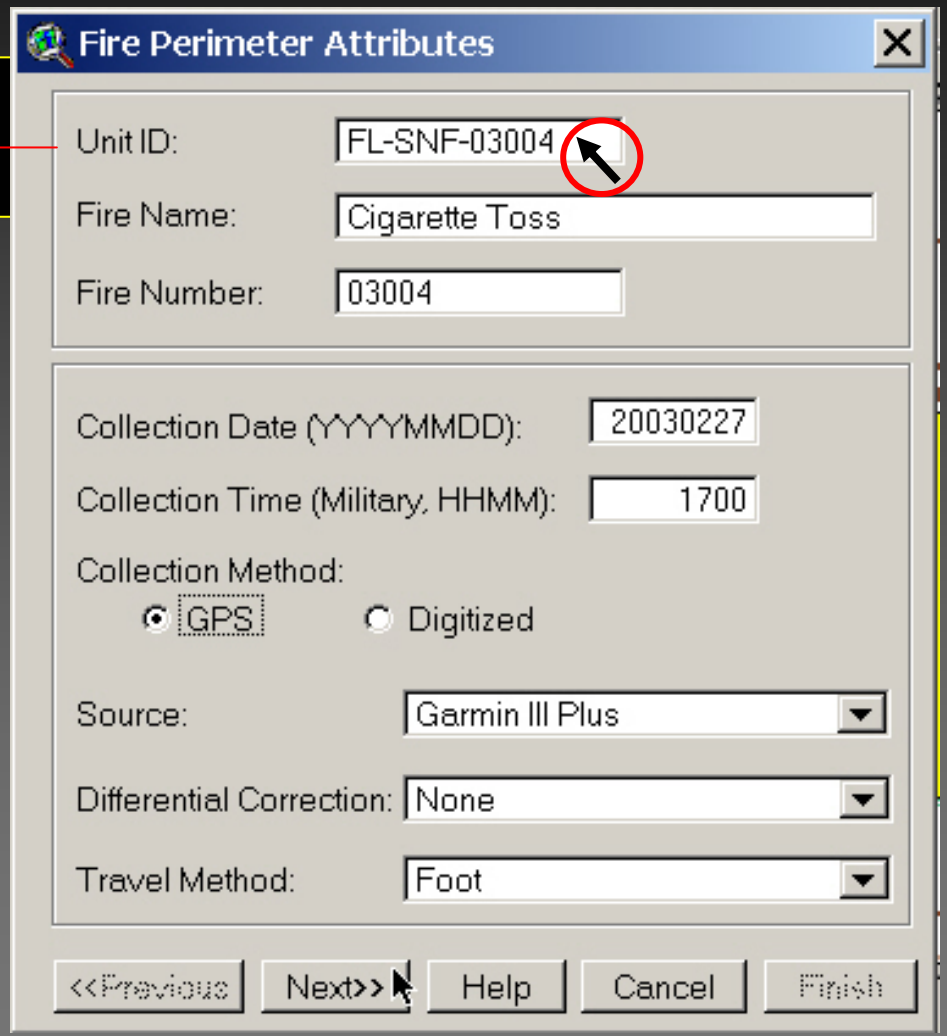


- Try again

FirePak Extension: Attribution

- Unit ID
- Fire Name
- Fire Number
- Collection Date
- Collection Time
- Collection Method
- Source
- Differential Correction
- Travel Method

TIP: Float cursor over field



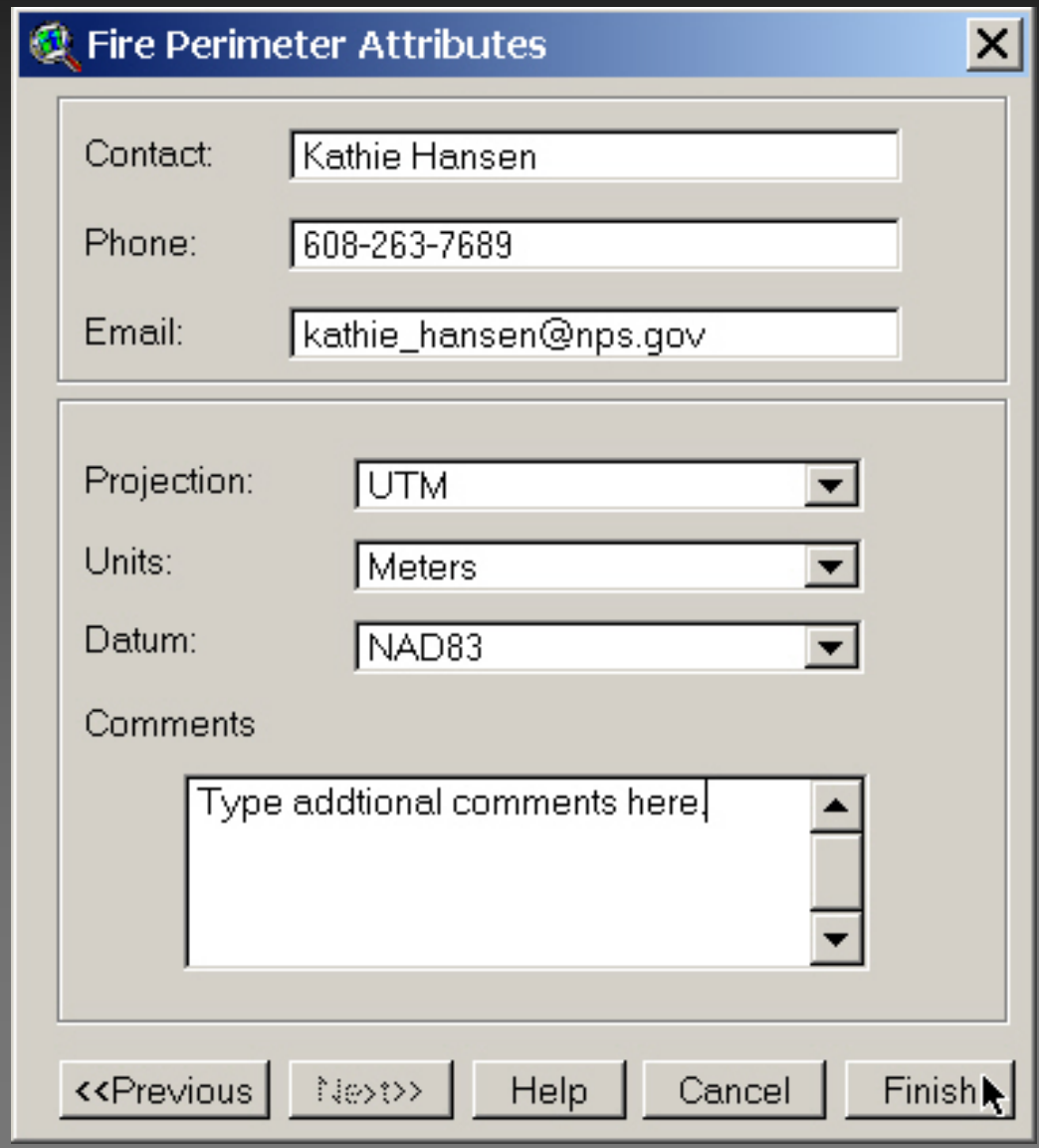
Unit ID (ex: AK-YUCH-001141)

Example displayed in the ArcView project status bar

FirePak Extension: Attribution

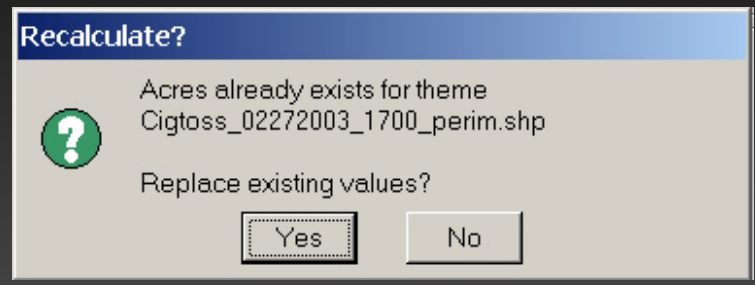
- Contact
- Phone
- Email
- Projection
  - Zone if UTM
- Units
- Datum
- Comments

- Finish!

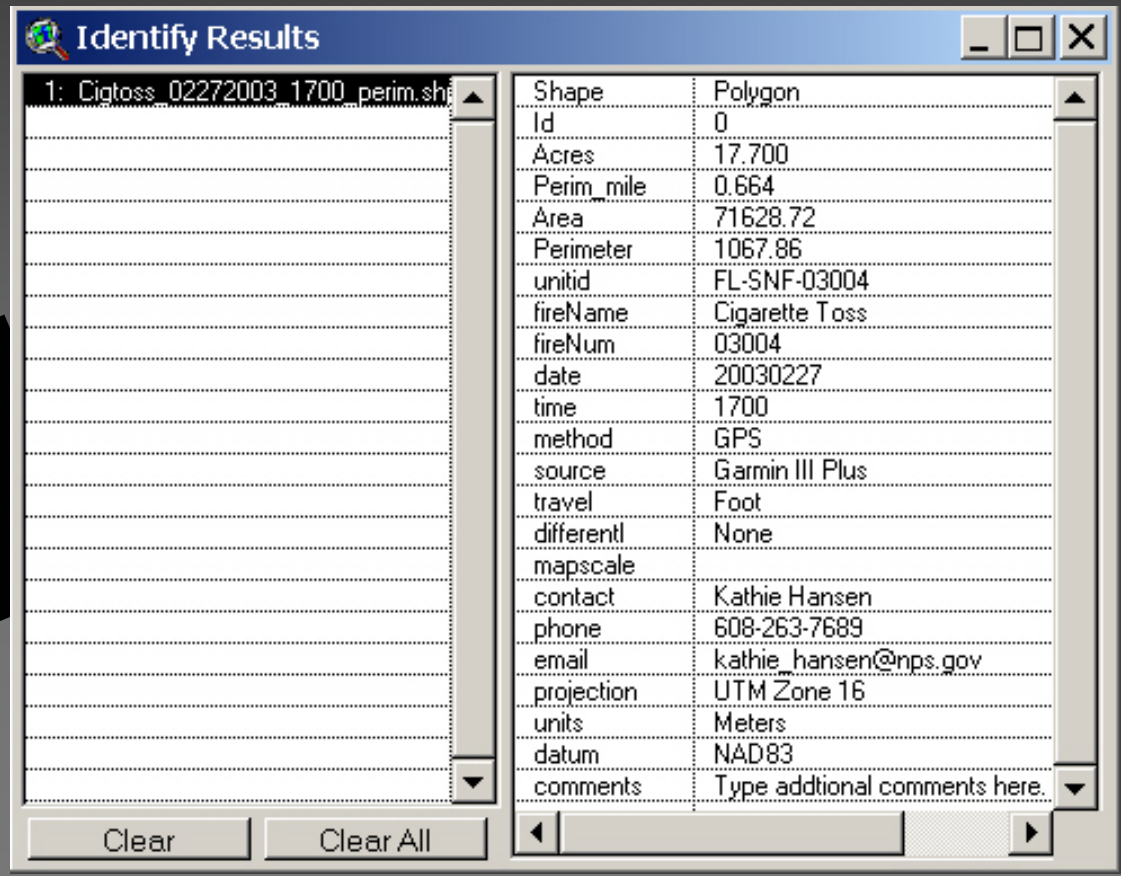


FirePak Extension: Attribution

- Recalculate Acres?
- Recalculate Perimeter Miles?



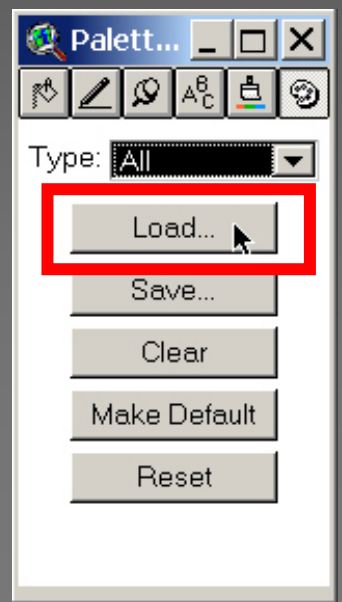
- Identify Polygon Attributes



Good attributes help with metadata creation!

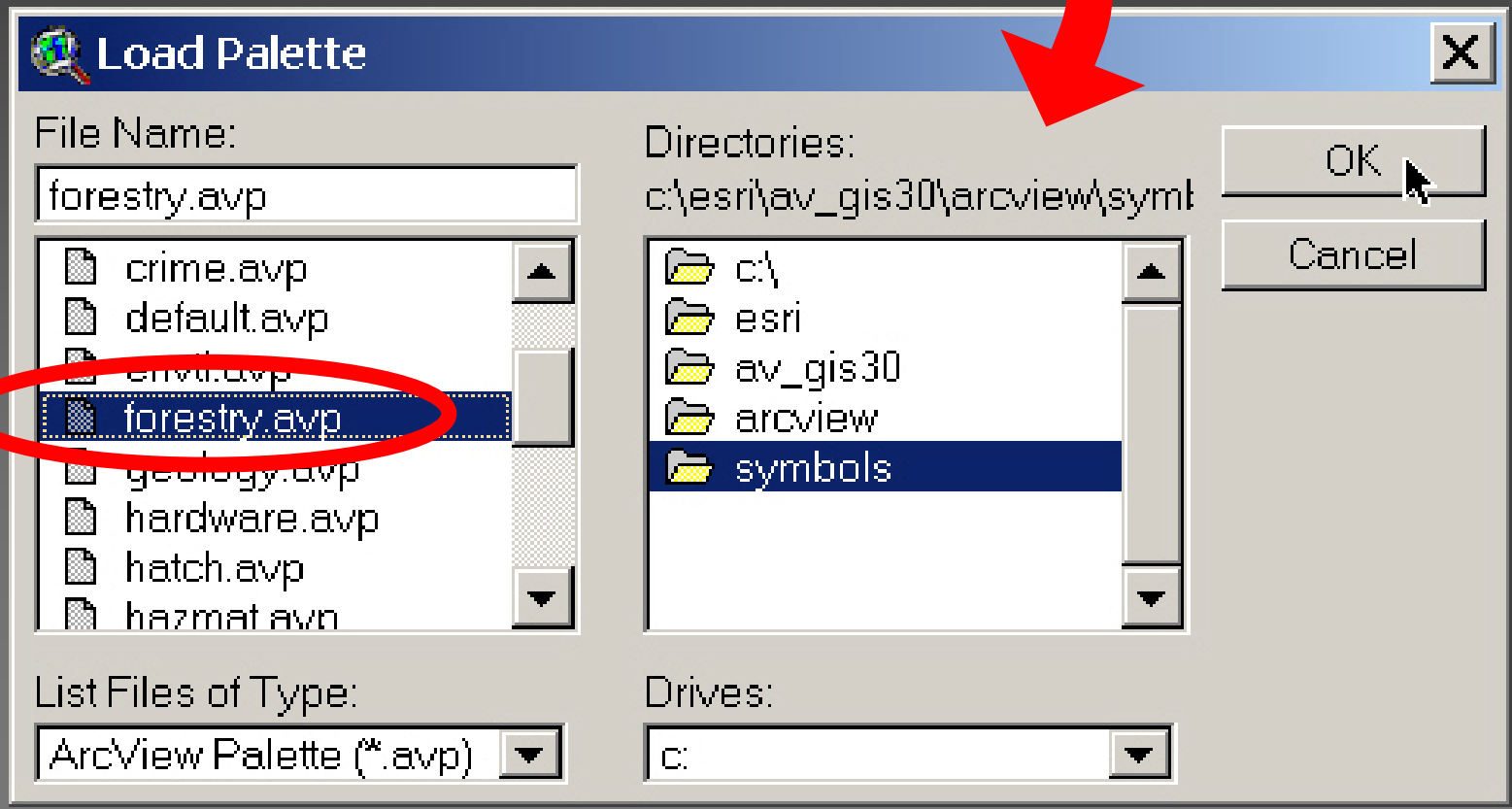
Advanced Legend Operations

- ArcView provides some **additional legend palettes** that can be loaded to your project
  - Double-click on a theme to bring up the legend editor and palette
  - Click on **palette** button
  - Click on **Load**



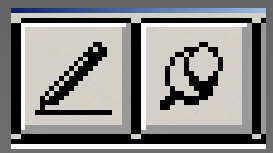
Advanced Legend Operations

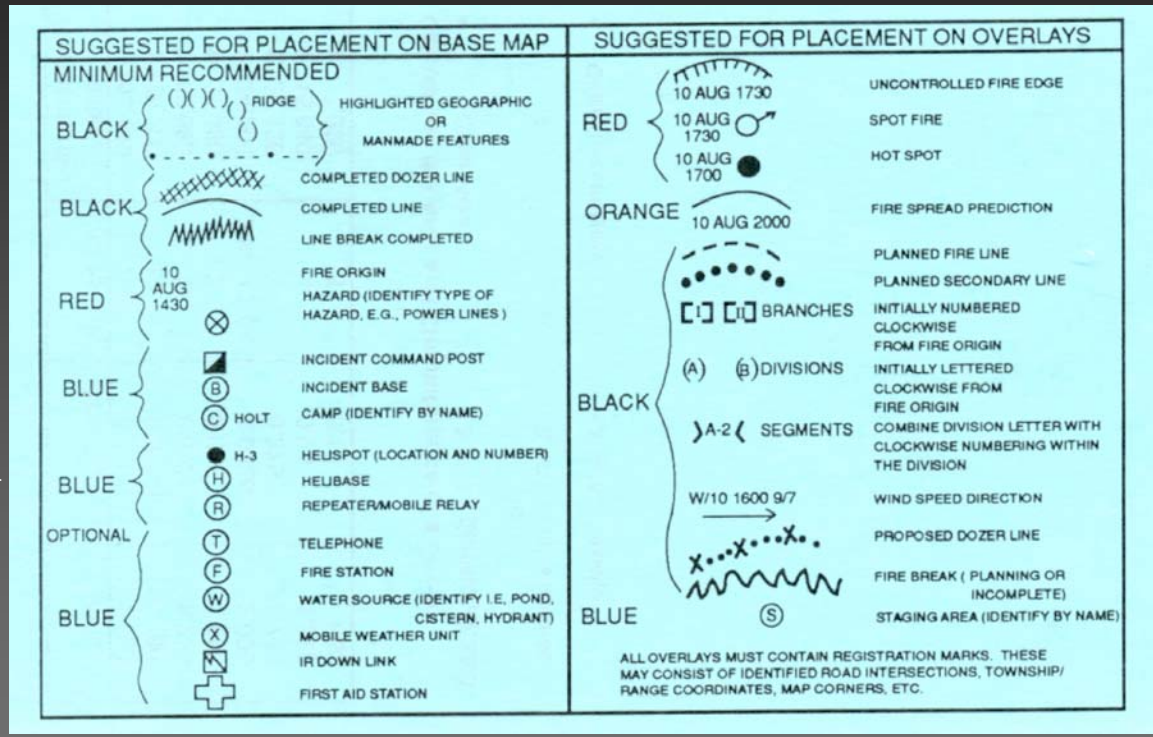
- Browse to **c:\esri\av_gis30\arcview\symbols**
- Select **forestry.avp** from list



Advanced Legend Operations

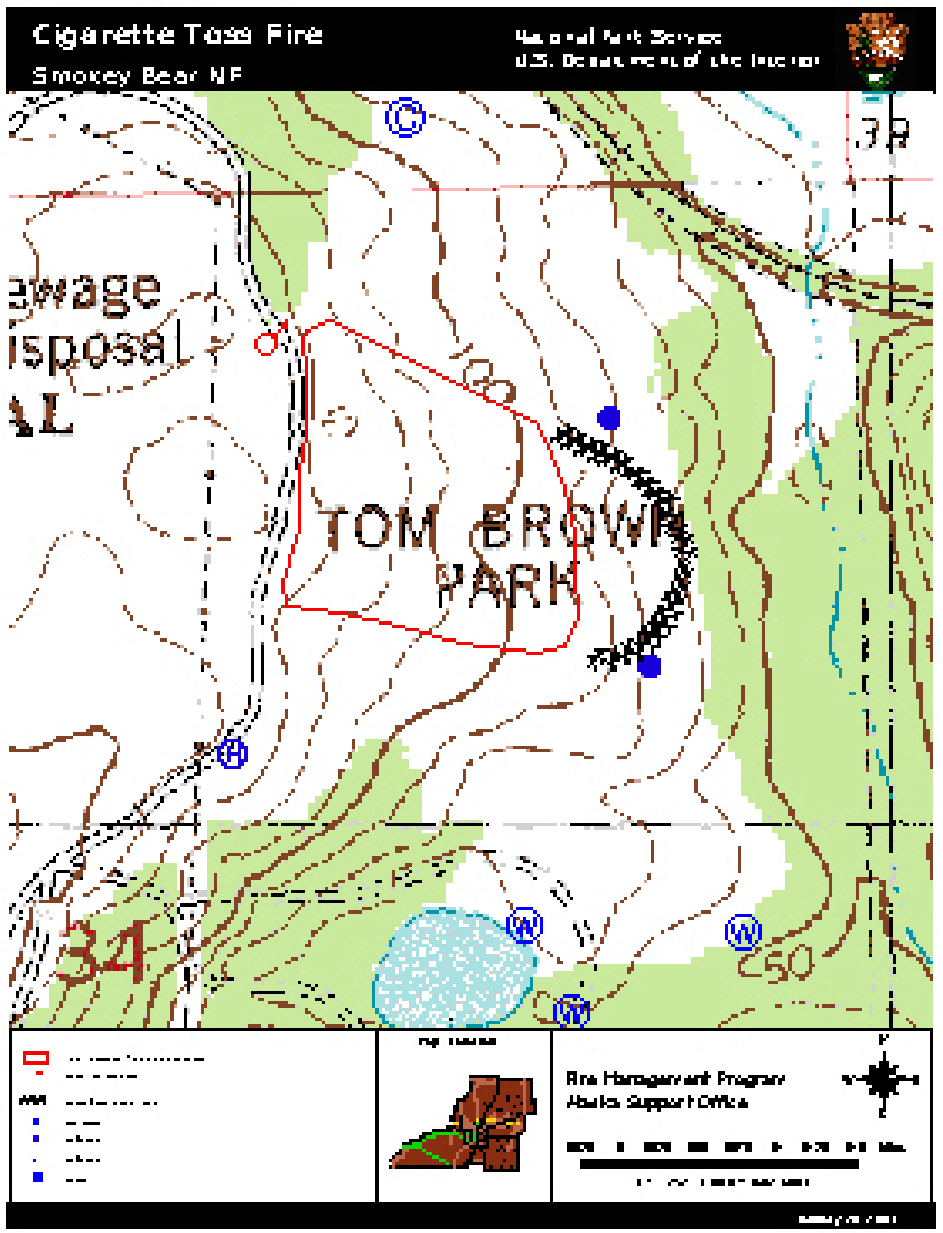
- **Forestry.avp** has symbology similar to suggested symbols in the **fireline handbook**

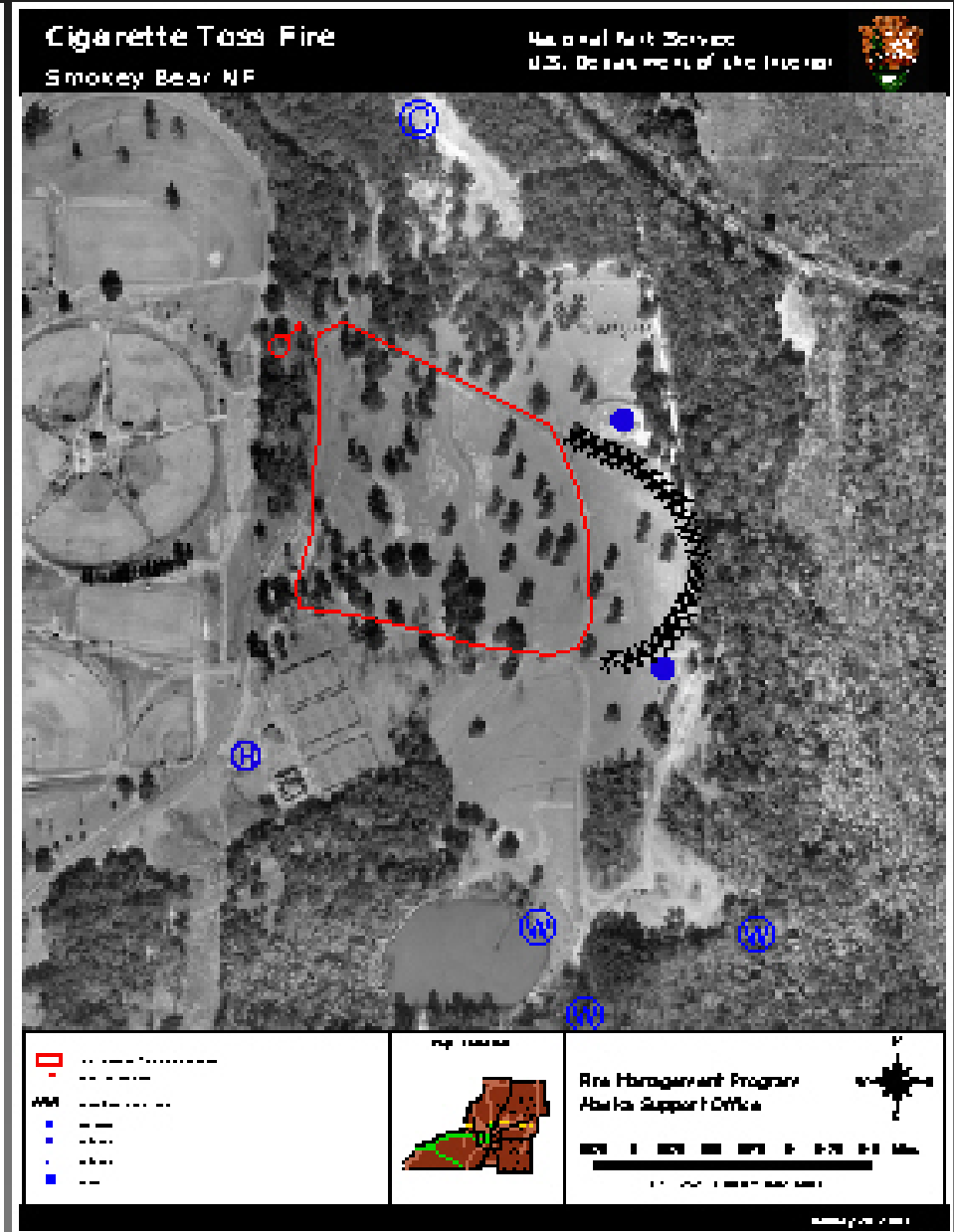




- Click on Pen and Marker Palettes to see additions
- Edit the legend for your themes
- Then, make a map with AlaskaPak!

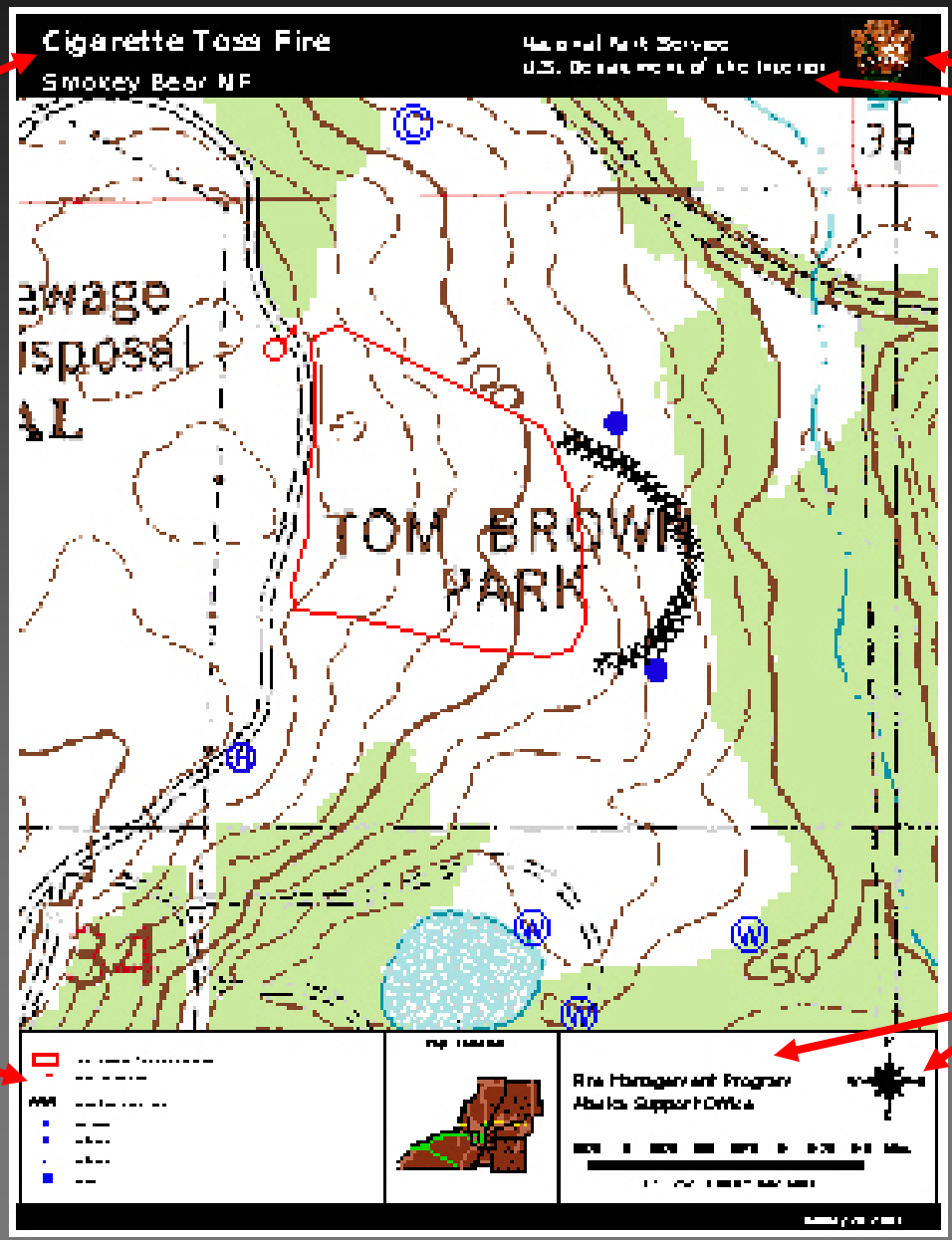
AlaskaPak Extension: Quick Map





What if you don't like this map?

Double-click to change



Double-click to change

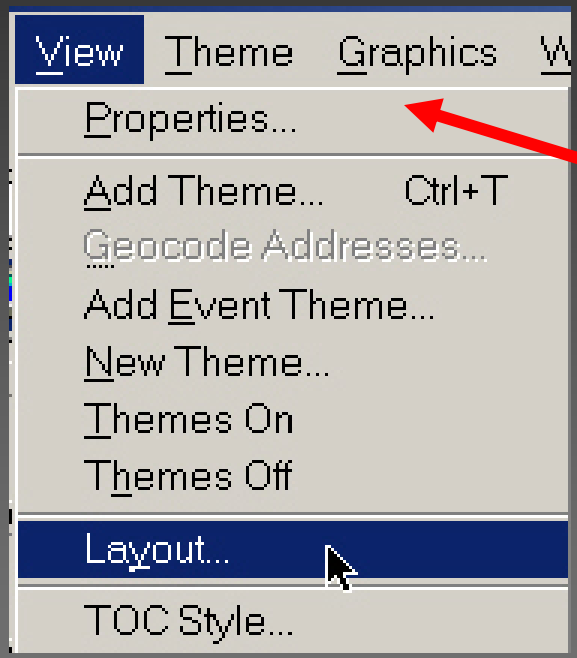
Double-click to change

Double-click to change

*you can find other logos on the CD in BASEDATA/ LOGOS

What if you don't like this map?

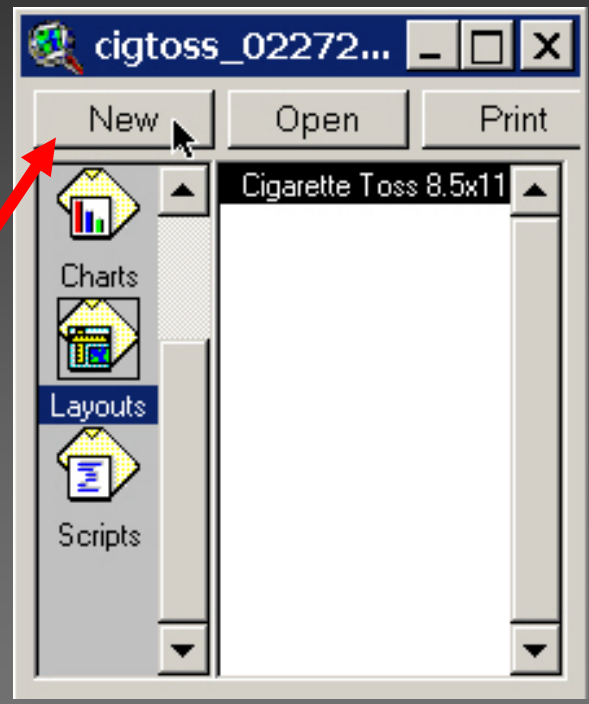
Create a Layout on your own!



View | Layout

OR

New Layout from Project Window



Review Pre-work ArcView Training or use **Help**

Save Layout & ArcView Project

- Export or Print Layout
  - File | Print
  - File | Export…
  - Save .jpg in products folder by date

- Save ArcView Project!!!!!!!!

Summary

- Installed and turned on FirePak Extension
- Attributed Fire Perimeter Polygon

- Performed Advanced Legend Operations
  - Added new palette to the legend editor
  - Used forestry.avp to change symbology

- Created a Layout with the AlaskaPak Layout Wizard or on your own

END OF POST-FIELD FOR CIGARETTE TOSS FIRE

- Close ArcView Project

Post-Field Summary

- DNR Garmin Program
- DNR Garmin Extension in ArcView

Managing GPS Data

Editing GPS & GIS Data

Attributing Data

Map Making